ume XI

Number 1

Plastic Products

JULY
1934

DIACETONE
C.S.C.

An Unusual Combination of Properties

Diacetone C. S. C. presents a combination of properties which merits attention for many industrial purposes. It is miscible with all common organic liquids, and completely miscible with water. It is an excellent solvent for nitrocellulose, for cellulose acetate, for many oils, fats, resins, and dyes. While diacetone in its characteristics is quite similar to acetone, its rate of evaporation is much slower, being about one-sixtieth (1/60) that of acetone.

Diacetone C. S. C. provides an excellent means of reducing the viscosity of heavy organic liquids and solutions; it is a preservative of animal tissue; it is useful in the formulation of both nitrocellulose and cellulose acetate lacquers; it makes a valuable ingredient for metal cleaning compounds and in cements for celluloid and other cellulose plastics.

PROPERTIES
ACETONE-FREE

COLOR: Colorless to light straw

ODOR: Mild, mint-like

FLASH POINT: About 55° C.

MELTING POINT: −54° C. to −57° C.

BOILING RANGE: 130° C. to 175° C. Approximately 85% distills between 150° C. and 170° C.

VAPOR PRESSURE: At 27.5° C. = 7.0 mm. of mercury

WEIGHT PER GALLON: 7.81 pounds at 68° F.

PRODUCTS

ACETONE • BUTANOL* • BUTYL LACTATE
BUTYL STEARATE • BUTYL ACETATE
DIACETONE • BUTYL ACETYL RICINOLEATE
DIBUTYL ETHER • DIBUTYL PHTHALATE
ETHYL ALCOHOL • ETHYL ACETATE
BUTALYDE* • METHANOL • METHYLAMINES

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NRA

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UMBRELLA HANDLES

A SHOWER OF *Style* A RAINBOW OF *Color*

When skies become overcast and rain threatens—it is fashionable as well as prudent for Milady to sport her Catalin-handled umbrella.

Catalin, the gem of modern industry, is the ideal material for umbrella, cane and similar handles. It charmingly interprets style motifs and attractively portrays the vogue in the season's color preferences.

Catalin is desirably light in weight. Its colors are rich, vibrant, alluring. It machines as easily as brass or wood. Requires no special machinery—no special tools—no expensive mold charges. It is available in rods, sheets, tubes and special castings.

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AMERICAN CATALIN CORPORATION

ONE PARK AVENUE • NEW YORK

Sales Offices

CHICAGO DETROIT PHILADELPHIA PROVIDENCE LOS ANGELES NEW HAVEN

Plastic Products

Contents July 1934

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Volume XI **Number 1**

PLASTIC PRODUCTS is published monthly by Plastics Publications, Inc. Williams Haynes, *Chairman of the Board;* R. C. Gilmore, Jr., *President;* Robert C. Gilmore, *Vice-President;* Malcolm H. Frost, *Secretary;* William F. George, *Treasurer.* Published on the first day of each month at E. Stroudsburg, Pa., and printed for the publishers by the Hughes Printing Company. Entered as second class matter at the Post Office at E. Stroudsburg, Pa., under the act of March 3, 1879. Subscription rates: Domestic, two dollars, in advance; Canadian, Foreign three dollars a year; single copies current issue, twenty-five cents each, back issues, fifty cents each. Notice of three weeks is necessary to change subscriber's address. Kindly give both the old and new addresses. Editorial and Advertising offices, 25 Spruce Street, New York, N. Y.

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Devine has installed Nickel kettles in every branch of the Plastic Industry. When equipped with auxiliaries, the Devine kettle gives the maximum efficiency of operation, simplicity and absolute control of uniformity.

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ADVANTAGES OF

PURE NICKEL EQUIPMENT

IN THE MANUFACTURE OF PLASTICS AND OTHER ORGANIC PRODUCTS

Freedom from copper and iron...corrosion-resistance... great strength and adaptability...all insure better product quality at lower costs for cleaning and maintenance

THE large and rapid expansion since the war, in the manufacture of plastics and related products, has been paralleled by a corresponding improvement in methods and equipment essential to this highly specialized branch of the process industry. Growth has come in two ways. Achievements in synthetic chemistry have forced the development of special equipment of improved design. Metallurgists and engineers have applied materials of the correct chemical and physical properties to these new equipment problems.

Pure Nickel equipment is now being used in a wide variety of operations, particularly those involving the presence of corrosive conditions from both organic and inorganic sources. Where high corrosion-resistance and freedom from iron and copper contamination are essential, Pure Nickel is preferable to other metals and alloys. Examples of Nickel's superiority are to be found in the production and handling of such highly corrosive inorganic agents as caustic soda and organic products such as phenol, formaldehyde, nitrocellulose, camphor, cellulose acetate, viscose, resins, rubber latex and many similar substances.

CONDENSING — Pure Nickel tubular condenser with outer shell removed. This unit is used in the production of pure phenol by a well known coal tar refining company.

Nickel is also widely employed with great success in contact with photographic gelatines and emulsions, perfumes and food products. It imparts no contamination and causes no discoloration.

In the presence of acid conditions, Nickel provides resistance to the corrosive attacks of the non-oxidizing group of acids such as sulphuric, hydrochloric, phosphoric and acetic, within moderate limits of aeration and elevated temperatures. Toward alkaline solutions, Nickel's resistance is extremely high, even in the presence of corrosion-accelerating conditions, making this solid metal ideal for many types of equipment used in the manufacture of rayon.

In addition to its high corrosion-resistance, Nickel offers the decided advantage of ready cleanability—an important cost factor in handling and processing the products named. Nickel possesses a dense, close-grained surface which gives a glass-smooth surface that is easy to keep clean and sanitary; a surface, moreover, that is safe for handling products subject to damage through chafing.

Although most equipment used in the process industries is built to individual specifications, this fact offers no handicap to the use of Nickel. The mechanical characteristics of Nickel are similar in many respects to those of mild steel. Nickel is tough, strong and highly resistant to denting and abrasion—yet it is relatively easy to fabricate and weld. Thus it lends itself to the construction of the heaviest as well as the lightest processing units, at moderate fabricating cost. And once installed, it requires little or no attention aside from routine cleaning care.

At the present time, Pure Nickel (or Nickel-Clad Steel) is being used in the process industries chiefly for storage tanks, truck tanks, hoppers, mixers, pipe lines, valves, pumps, heating coils and similar units, but these uses only suggest the many ways this versatile material is able to help manufacturers obtain maximum protection and, at the same time, reduce maintenance costs.

The uses of Nickel, as well as applications of Monel Metal, are described in a lefax folder entitled "The Application of Monel Metal and Nickel to Industrial Processing Equipment." This folder, together with a booklet "The Design and Construction of Heavy Equipment in Monel and Nickel," may be obtained by writing to The International Nickel Co.

•

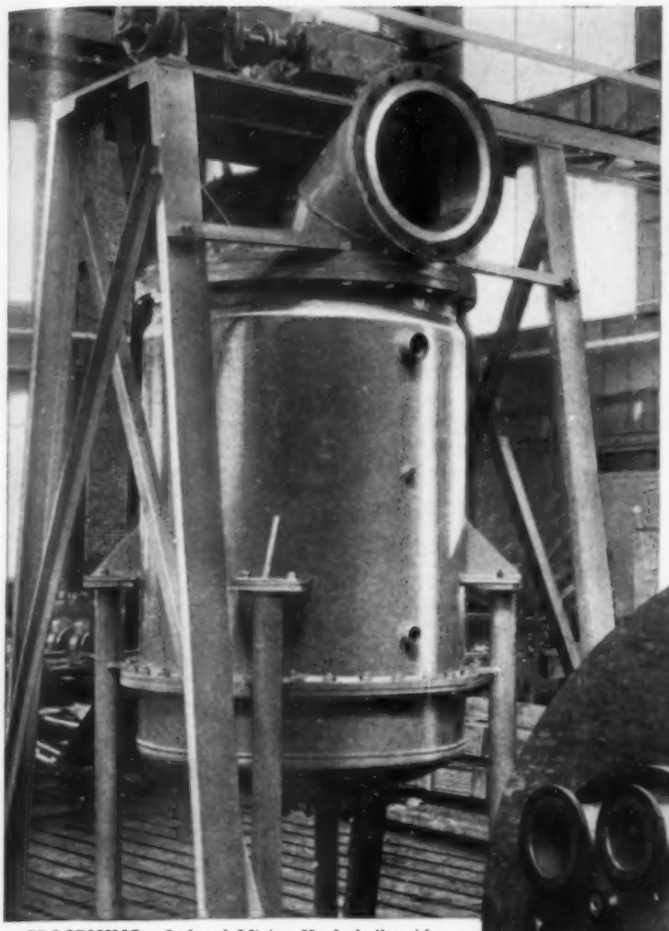
THE INTERNATIONAL NICKEL COMPANY, INC.

Miners, refiners and rollers of Nickel.
Sole producers of Monel Metal

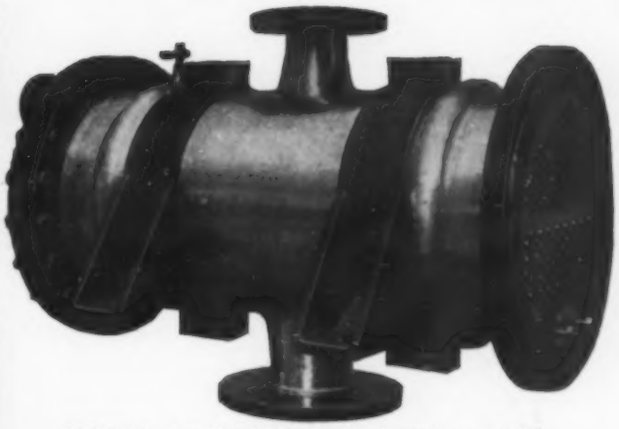
67 WALL STREET NEW YORK, N. Y.

MECHANICAL PROPERTIES OF NICKEL

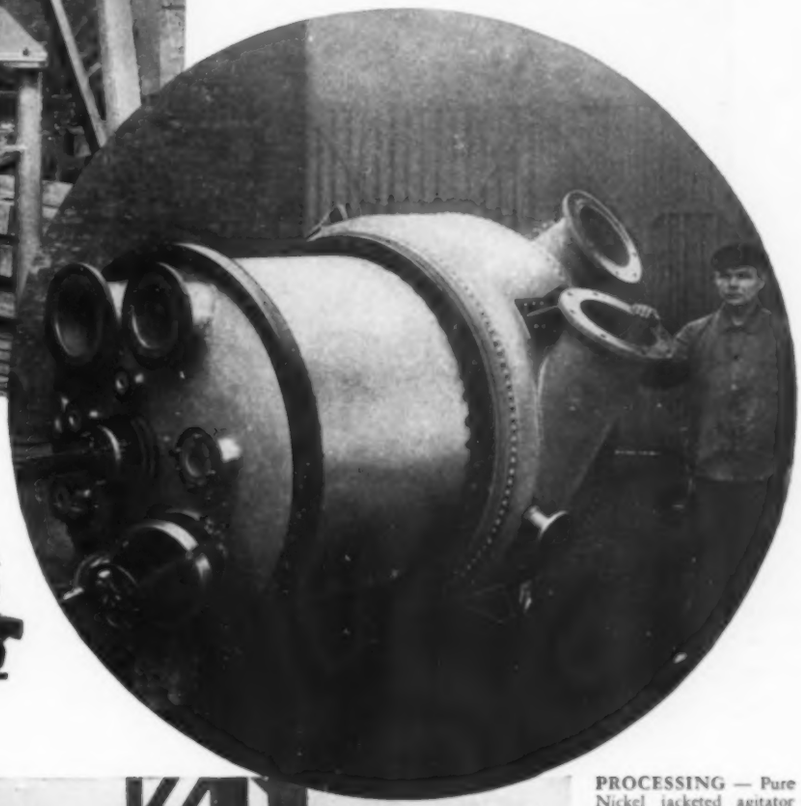
	Tensile Strength lbs. per sq. in.	*Yield Point lbs. per sq. in.*	*Elongation in 2 in., per cent*	*Reduction in Area, per cent*
ROD AND BAR—*cold drawn*				
Annealed	60,000- 75,000	15,000- 25,000	35-50	65-75
As drawn	80,000-115,000	65,000- 90,000	15-40	50-65
Hot rolled	65,000- 85,000	20,000- 30,000	35-50	50-65
Forged	75,000-100,000	50,000- 75,000	20-45	....
WIRE—*cold drawn*				
Annealed	65,000- 80,000	.....	....	....
No. 1 temper	90,000-105,000	.....	....	....
Regular	105,000-140,000	.....	....	....
Spring	140,000-175,000	.....	....	....
PLATE—*hot rolled*	65,000- 80,000	15,000- 25,000	35-45	....
SHEET AND STRIP				
Full-finished sheet	65,000- 80,000	25,000- 35,000	....	....
Cold rolled				
Annealed	60,000- 75,000	15,000- 25,000	35-50	....
Full-hard	100,000-115,000	90,000-110,000	35-50	....
TUBING—*cold drawn*				
Annealed	60,000- 75,000	15,000- 25,000	35-45	....
As drawn	80,000- 95,000	50,000- 65,000	25-35	....
CASTING	60,000- 70,000	20,000- 30,000	15-35	30-50

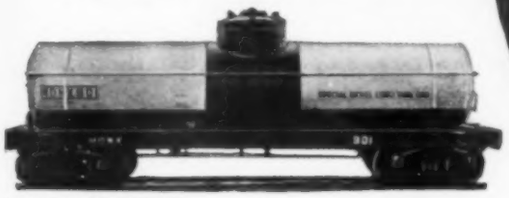


PROCESSING—Jacketed Mixing Kettle built with pure nickel inner vessel, nickel head, goose-neck and stirring device. This unit is used in the manufacture of synthetic resins employing formaldehyde.



COOLING—Pure Nickel phenol cooler. Dimensions: 16⅛" dia. by 36¼" long by ⅛" thick. Contains 194 welded-in pure nickel tubes, ⅜" O. D. by 36½" by 20 gauge wall. All welded construction.

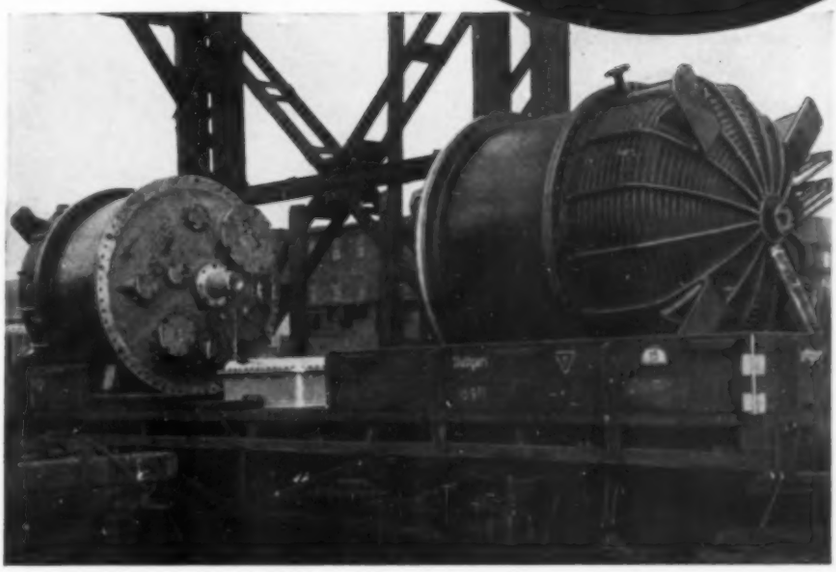




TRANSPORTATION—A large fleet of MONX tank cars supply consuming industries with technical chemicals produced by Monsanto Chemical Works at its plant in Monsanto, St. Clair County, Illinois. The special type of car shown above is used in phenol service and is built throughout of Nickel-Clad Steel by the General American Tank Car Co. using Nickel rivets, and fitted with solid Nickel castings. There is no possibility of contamination or discoloration of the product by iron or other objectionable metals. The quality is safeguarded in transportation as in manufacture. The exterior of MONX tank cars is painted in the Monsanto colors, red and buff with black trim.

•

PROCESSING — Pure Nickel resin melting kettles of welded construction with special tubular steel heating jackets. These nickel kettles are operated at a steam pressure of 100 atmospheres and at a temperature of 280° C. The nickel shells of the kettles are 5 m.m. thick.



PROCESSING — Pure Nickel jacketed agitator kettle built for Chemische Fabrik, Dr. Kurt Albert, G.m.b.H., Amöneburg/Wiesbaden, Germany. This heavily constructed nickel kettle is used in the production of synthetic resins.

INCO NICKEL

Modern Design

SEEKS BEAUTY IN SIMPLE FORMS AND RICH MATERIALS

THE ornate table service may have a beauty of its own, but it is unsuited to this practical, fast moving age. Modern designers have discarded elaborate ornamentation, and for beauty rely upon attractive line and form, supplemented by the inherent beauty of the materials used. The Bakelite Molded tray shown, for example, was formed in one molding operation, with the silver decoration firmly embedded. The high lustre surface was also acquired in the polished mold, from which any number of reproductions can be made.

The adaptability of Bakelite Molded to the faithful interpretation of the artist's designs, its attractive colors and rich lustre, its light weight and unusual strength, its resistance to water, oils and most chemicals, and the practicability of accurate reproduction in unlimited quantities, makes it ideal from the standpoint of both designer and manufacturer.

Bakelite Molded is made in a number of different types and in a variety of pleasing colors. There is a type of Bakelite Molded to meet almost any special need, whether it be resistance to acids, alkalis, moisture, heat, high tension current, or the need for exceptional strength or high lustre. This variety gives the custom molder an excellent opportunity to expand his business through proposing Bakelite Molded for parts now formed in other ways and of other materials.

Our new edition of booklet 22M, "Bakelite Molded" contains interesting illustrated descriptions of Bakelite Molding Materials and their uses, and may suggest ideas for you to pass on to your present and prospective customers. Your request will bring a copy by return mail.

Photo shows a fine example of Sheffield Plate Courtesy Metropolitan Museum of Art) and a modern serving tray of black Bakelite Molded, with silver inlay.

BAKELITE CORPORATION, 247 Park Avenue, New York, N. Y. . . . . 43 East Ohio Street, Chicago, Ill.
BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin Street, Toronto, Ontario, Canada

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Textolite is the name of a family of products with a wide variety of form, in all of which synthetic resin binders are used. These products differ widely, however, in other properties. They range from wood-flour-filled hot-molded products, which may be formed into intricate shapes, to heavy-duty laminated material, available only in slabs or cylinders.

Check the twelve outstanding advantages of Textolite given below. There's a grade with a combination of these advantages to fit the particular needs of your product. Redesign now. Plan for greater profits by using Textolite.

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SEND FOR USEFUL BOOKLET

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2. Resilience
3. Resistance to corrosion
4. Electrical insulation
5. Variety of form
6. Lightness
7. Does not score; does not adhere to metals
8. Uniformity of structure
9. Easily fabricated
10. Permanency of properties
11. Low heat conductivity
12. Decorative

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A BRIGHT IDEA

MADE STILL BRIGHTER
BY A

"Beetle" MOLDING

An ingenious device is the L. H. Hyatt Company's self-measuring cream dispenser, for restaurants and soda fountains. And just as ingenious is Norton Laboratories' job of molding this dispenser. Norton chose "Beetle", because it offered the vivid contrast of gleaming white and jet black.

Quote "Beetle" on *your* next job—whether it's a cocktail set, a thermometer, a premium, a valve handle, or what not. Beetle Molding Powder comes in two types: Granular for tabletting; Fine Powder, which can't be tabletted, but costs less and makes smoother surfaces. Either type will produce a more attractive job in any color of the spectrum—a fact which "Beetle" sales promotion is continually telling your prospective customer.

SYNTHETIC PLASTICS COMPANY
30 ROCKEFELLER PLAZA NEW YORK, N. Y.
A Unit of American Cyanamid Company

Plastic Products

VOLUME XI NUMBER 1

"Beautiful, but Dumb"

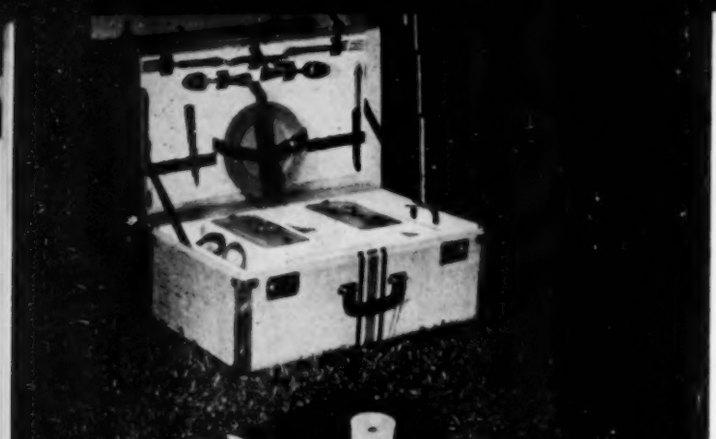
A REVOLT we have been expecting some time was stirred by the last Packaging Exposition. Inspired by the decided overemphasis placed upon the artistic aspects of container design, two officers of the Kalamazoo Vegetable Parchment Co., H. H. Jones, the sales manager, and Glenn Stewart, the advertising manager, have addressed an open letter to the various trade magazines calling loudly for proper awards to encourage the utility of modern containers.

This is a very sensible thought. It is one that the makers and users of synthetic plastics especially should heed. It goes much further, of course, than the packages, and it calls for a vigorous display of the masculine common sense of the Philistine business executive.

No materials lend themselves more adaptably to the uses of modern art than do the plastics, and we have all profited by the artistic movement in industry. In many minds the newer designs are identified with plastics, and just because of this close association, our materials will suffer most should there be a wide-spread adverse reaction. We have therefore the soundest selfish reasons for preserving the best in the artistic movement. No group, save only the commercial designers themselves, should more zealously discourage discrediting extremes.

This is a real danger. Any style appeal that proves popular is apt to be overdone. Seeking for more and more startling effects leads naturally to the neglect of that true proportion, that balance, that subordination of decoration to usefulness which is the very first tenet of good design. After all the primary purpose of a container is to contain something safely and conveniently, and the most stunning shelf appeal will be quite ruined, so far as a repeat sale is concerned, if the container is unsafe or awkward.

Truly effective design cannot have these undesirable characteristics. Our best designers have long been preaching that an object need not be ugly to be useful. The second-rate men and the out-and-out imitators who have swarmed into the fields of commercial art should be told quite plainly that an object need not be useless to be beautiful.



"I Want to Buy a Plastic-fitted Picnic Set"

By Dorothy Wilson

IF the men of the plastics industry want a real experience they ought to sally forth on a plastics shopping tour. Be they sales manager or chemist, molder or maker of raw materials, they will acquire some astonishing knowledge. A great deal of the information they gather will not square with the facts they have fondly believed in; but they will learn much they have never suspected. It will be, I can promise, a real experience—and a most illuminating one too.

Just at this season a picnic basket, fitted with plastic plates and cups, is a reasonable purchase. It promised enough variety of styles and sizes to furnish some good talking points. We therefore selected it as a test purchase for the readers of PLASTIC PRODUCTS.

Among the New York department stores, two stand out in their respective classes as having made a specialty of all sorts of goods made of synthetic plastic materials, and I chose Altman's and Macy's for this shopping inquiry.

A picnic basket, so I learned by trial and error, is an empty wicker hamper: a fitted picnic basket is a picnic case, not a basket at all, but a small suitcase and is to be found at Altman's in the leather goods department. Tall, slender, dark-haired Miss M., who came forward to show me a picnic case, is one of those quiet, friendly, tactful saleswomen one finds in the better Metropolitan stores. She was sincerely interested in selling me and most helpful in trying to find out just what I needed.

"I want to buy a fitted picnic case."

"We have them for either four or six people. Here's a very satisfactory one for six for twelve fifty," and she put on the counter a brown imitation leather case with a tin box for salad, a compartment for a quart thermos, a glass jar with a tin-top, six plastic cups with handles and fitted snugly into the cover, six spoons, knives, and forks with wooden handles and six oblong plastic plates. The color scheme was brown box and bright canary yellow fittings.

"What," I asked, picking up one of the cups, "are these made of?"

"Celluloid—the very latest thing."

In my astonishment I nearly dropped the cup turning it over to see if it had a molder's brand or trade mark underneath. There was none, but the cup was certainly not pyroxylin, possibly a phenolic, almost surely a urea material.

"But does it stand heat?" I managed to ask.

"Do you mean does it crack when something hot is poured in?"

"Does it either crack or get soft?"

"Oh, no! We've never had any complaints."

"But they do break, don't they?" I persisted.

"Well, yes, they're not strictly unbreakable, but they are not nearly as easy to break as china; they are so much lighter and less expensive."

"Have you any cases with enamel cups?" I asked to coax her on.

"No, all our cases are now made with this new material. It is quite the newest thing, and we don't stock enamel any more, though we could make them up for you specially. But," she added, "they are much more expensive and a great deal heavier."

"Why isn't the tin box made of the same material as the plates and cups?"

"I don't know," she answered and beginning to size

What the public is being told about plastics by the salespeople in the retail stores concerns us, and this is the first of a series of articles by an experienced department store shopper, reporting verbatim just how sales are being made —or unmade. The "5 and 10" selling philosophy is to show the goods and let the public buy. The department stores, a typical example of which is recorded here, spend much money, time and effort in training their salespeople. The specialty stores, which our inquiring reporter will visit next month, have the reputation of doing the most intelligent sales job. Read this article and compare it with next month's interviews.

me up as a some sort of an old fashioned lady from Missouri, she started cleverly to sell me the Altman name, since she did not know how to sell the plastic.

"These cases are specially made for us, and the regular Altman guarantee is behind this material. We've never had any complaints and I'm sure you'll find it quite satisfactory. If you should possibly have any trouble, you can count on the Altman guarantee."

We looked at other styles and sizes, and I soon learned that prices depend more on the case than the fittings, but I failed dismally to elicit any more information, either from Miss M. or another clerk who was called into consultation as to the "Celluloid" cups and plates. And her last word was: "I'm sure you'll find them perfectly satisfactory, and besides Altman stands behind them."

At Macy's a picnic case is a picnic set and is to be found, not with the leather goods but in the sporting goods department. Here I was waited on by Mr. C., a typical "Macy special," a good-looking, well groomed college man, crisp, frank, alert, speaking the modern language with a New England twang.

"A picnic set? Certainly, here you are for four. We have them for six too; but they sold so well over the week-end we're out. We'll have them in again tomorrow or Friday," and he placed on the counter for my inspection almost a duplicate of the Altman set, save that the plates were round and of enamel ware.

Again I began by asking, "What are these cups made of?"

"Bettleware—this new stuff. It's at once smart and superior," and he smiled cheerfully.

I called his attention to the Richelain trademark on the bottom and he explained, "That's just the maker, the stuff's Beetleware?"

"But what is Beetleware?"

"Oh, this new stuff. They're using it for everything from golf clubs to bath tubs."

"Why?"

He looked positively grieved. "Why? Why because it's new—and oh yes it's light and it doesn't break."

"Is it really unbreakable?" I asked with quite honest skepticism.

"Practically."

"I've heard they are hot to drink from if you put hot coffee in them."

"Not so hot as aluminum; but why not drink cocktails?" he asked in true Yankee fashion. "You know," he confessed frankly, "I never drank anything out of one of these cups, but they tell me they're all right."

"Won't they crack pretty easily? They seem very thin and fragile to me."

"Well, of course, they will dry out and crack in time"—

"Sort of like a pair of patent leather pumps," I suggested wickedly.

"That's the idea," he assented. "But," he added quickly, "they will stand a lot of rough usage first." He played a kind of mumbledepeg game on the counter with a couple of the cups. "And," he added in a burst of confidence, "you can replace them at the nearest five-and-ten. Have you noticed this flexible handle?"

"Why aren't the plates the same material as the cups?"

"They'd scratch if you cut on them and there's no need to have them so light. But," he went on to another subject, "these locks are really locks—they are tight and they hold."

"Why isn't the sandwich box made of plastic?"

"There isn't any reason why it should be, but the case lining is that new du Pont 'Fabrikoid' material, so you can wash it out."

He was persistent in changing the subject and went on very skillfully to sell me the stainless steel knives, the compactness and lightness of the whole case, and all round superiority of this particular picnic set.

Sales Clerks Strongest Selling Argument

But I was interested in plastics—and so are the readers of PLASTIC PRODUCTS.

Two samples will not prove the case; but I have done a lot of plastic purchasing and these shopping tests are quite typical in that they show that most of the New York salespeople are telling their customers that plastics are good because they are new. Few of them know what they are or why they are used. Almost none of them could by any stretch of imagination be called "plastic conscious."

Condensation Products from Drying Oils

A new resinification reaction, developed by I.G., requires the reaction of tertiary bases, such as trihydroxyalkylamines, with long chain fatty acids, such as oleic, linseed oil or resin acids. The product of the reaction is a hard resin, insoluble in dilute acids. In the process, gradually heat a mixture of 37 parts of trihydroxyethylamine with 213 parts of rosin; in 2 to 4 hours raise the temperature to 300°C., driving off all the water formed. The final product is a hard resin, melting at 75°C., easily soluble in benzol and ethyl acetate, insoluble in alcohol and dilute acids, soluble in drying oils, and giving varnishes distinguished by resistance to alkalies.

Photographic Marble

A synthetic process which vies strongly with the natural material and holds many possibilities for myriads of other uses

By C. Tyler, Ph. D.

ONE of the newer developments in the field of applied science is that of photographic marble, a remarkable material which reproduces exactly the color and pattern of marble because it is made from a photograph of real marble. A surface coating of synthetic resinous material lends the glossy finish of polished marble.

The process involves changing a sheet of asbestos cement into what is to all appearances a slab of beautiful imported marble. One of the essential tools is an enormous camera, one of the largest in the world, which takes a picture forty by forty inches. Before this is placed the material to be reproduced. In the case of marble, the finest samples of French and Italian marble are used. The method of photography is the same as in color-engraving. From the big negatives, metal plates are made, one for each color to appear in the finished article. These are employed to imprint the pattern, with colored dyes, on a sheet of film-coated paper. This paper serves as a matrix for the transfer of the pattern to the final material, such as asbestos board. Transfer occurs in a hydraulic press at a high temperature and a pressure heavy enough to make a permanent imprint—it is in the material rather than on it. The surface of the imprinted material is then sprayed with a solution of synthetic resin in preparation for polishing, a high gloss being obtained with a polishing machine. The finished article is finally trimmed to shape by an abrasive wheel.

Photographic marble is made in standard sized slabs, 32 by 48 in., and 3/16 to ¼ in. thick and is used as wainscoting, for walls in banks, theatres, etc., and in general where marble is considered desirable but costly. Because of the simplicity of the process, the ease and rapidity of production, it is amazingly inexpensive. Where real marble sells for $5.00 to $6.00 a foot, this material sells for 35c to 56c a foot. Its practical nature suggests a bright future, as it is waterproof, fireproof, and does not crack or warp, and installation is easy and economical.

This newer-type marble is durable on walls, where there is no great amount of abrasion. Installed as sheathing in shower baths of a country club some five years ago, it is still unmarred and unaffected by alternate hot and cold water. If there is much abrasive action, photographic marble is sometimes combined with real marble. For example, soda fountains sometimes use real marble for the top and the kickboard of the fountain, and matching photographic marble for the sides. Marble workers themselves state that the appearance is the same.

To meet the demand for this product when wear is the important factor, a new development is the application of laminated or shatter-proof glass like that used in automobile windshields. The sheet of clear colorless Celluloid used as the center layer in laminated glass has been replaced with Celluloid imprinted with the desired marble photograph. This gives a glassy surface, therefore one resistant to acid, alkali, or exposure and may be used for table tops and outside decorating purposes. In particular it has found application as a front for cafeterias, where the intention is to appeal first to the eye, then to the appetite.

This same process has been adapted to many other uses. The photographic reproductions are also applied to wood, plywood, aluminum and sheet metals, canvas, fabrics, calfskin, cowhide, imitation leather, slate, etc., as base material. Any smooth and not too porous surface may be used. It will accept a dull or a glossy finish, receiving equally well a varnish or any of the various lacquer finishes.

Of great interest are the reproductions of rare and costly woods. Intricate inlays, exceptionally beautiful burled walnut, woods in which the grain or burl constitutes a design, are faithfully reproduced, thus opening a new field in furniture design. The desired photograph is applied to plywood faced with birch, maple, magnolia or any light colored wood of close, characterless grain. The photograph is forced into the wood and replaces the staining and filling operations. It may be finished with any standard furniture finish, has all the durability of the base wood, and repairs exactly as any other finish, scratches being simply filled and stained to match. Thus the hand work required for beautiful inlays and intricately matched veneers can in effect be transferred to quantity production.

Applied to calfskin for footwear, the appearance of costly and fragile reptile skin is obtained, with many times its wearing quality. Another development is the reproduction of a built-up leather heel. In this case the photograph is applied to Celluloid and the Celluloid used to cover a wooden heel. Several hundreds of thousands of pairs of these coverings are made in one process.

Applied to metal, penetration is not possible, as it is with less hard materials. On metal, however, adhesion is claimed to be superior to most forms of finishing. The metal may be color-processed and then stamped and formed.

The photographic process is radical, yet sufficiently simple and economical to warrant future application in many fields.

Determination of Proper Mold Sizes vs. Quantities

By Gardiner C. Wilson

WHEN a molder receives an invitation to bid on molded parts, it is quite customary that he be asked to quote on various lots. In many other lines large lots usually mean a lower price than small lots due mainly to savings on material costs. Molding compounds which are most used, such as the blacks and browns, are so priced, however, that there is no difference in unit cost of material between that required for the usual part in either 10,000 or in one million parts.

There is one factor, however, which very effectively influences the piece cost. That is the mold size.

Consequently it is quite essential to know what is the proper mold size for a given quantity to yield the most economical set up for the purchaser and the following formula or charts can be employed to assist in the standardization of this detail. Such uniformity should also lead to less confusion of the buyers in correlating their bids in order to judge their most economical proposition and should also reflect a businesslike presentation of bids from the molding industry as a whole.

Two methods have been developed, one by formula, the other by charts, for so determining the optimum mold size for a given quantity of a part in question. The formula method, since it meets the most involved situation in any plant, will be considered first. Both are, however, based on the fundamental relation that the cost of the mold shall balance the total cost of the parts for any given quantity. In other words, too large a mold will contribute to an excess total cost of mold and parts more than is offset by the lower piece cost. Too small a mold will cause the parts cost to contribute to the total cost of mold and parts more than is offset by the less expensive mold.

By equating these two components of total cost we find that:—

Parts cost per thousand times quantity in thousands
equals
Optimum mold cost.

Since to determine the optimum mold cost, we must know the optimum number of cavities it shall contain, hence we shall break down this item into:

Unit cavity cost times the number of cavities.

A first approximate estimate of unit cavity cost can usually be made within ten or twenty per cent. by anyone experienced in dealing with various mold costs for the usual parts. Accordingly this figure can be used as a starting point. Later if found that this first approximation of unit cavity cost was seriously in error, a new adjusted mold size can then be redetermined more accurately.

Since wage rates, overhead, and cycle or heats per hour, all have an effect on the proper mold size we must break down the parts costs per thousand to read:

Wages in dollars per hour plus overhead divided by
the production in thousands per hour.

The production in thousands per hour, of course, equals sixty divided by the cycle in minutes times the number of cavities all divided by 1,000. Hence our formula becomes:

$$\frac{W\left(\frac{100 + \%O.H.}{100}\right) 1000 \times Q}{\frac{60}{C} \times Y} = UY$$

Where: W = Wages in dollars per hour.
Q = Number of thousands in question.
C = Cycle in minutes.
Y = Number of cavities in proper sized mold.

For %O.H., or percentage overhead, it is intended that this shall include not only the customary manufacturing or press room overhead, but also any additional percentages that are later used in estimating which so become multipliers of the factory cost in adjusting the same to the selling price. These additional percentage factors are customarily used to cover such overhead costs as administration, engineering, selling expenses, etc. Thus, if 150% is used as manufacturing overhead in arriving at factory cost and then to this is added say a total of factors affecting the factory cost and hence labor by 25% more to bring up the total to the selling cost, our value of %O.H. for use in our formula should be the total of:

150% + 25% + 25% of 150% or 175% + 37.5%
or a total of 212.5%

This total is actually the total percentage burden by which labor or wages are affected in any total of selling price.

Although material and finishing costs are a factor in the selling price they are factors outside the direct elements that govern proper mold size. Their effect is for practical purposes so slight as to permit their omission for the sake of simplicity.

Simplifying our formula into a working tool gives:

$$Y = \sqrt{\frac{W\ (100 + \%O.H.) \times C \times Q}{6U}}$$

The above is applicable to any set of conditions and is particularly adapted for direct use by the majority of molding plants who use an overhead percentage based on direct labor.

Those plants who arrive at a total of overhead by having a

variety of percentages or values for each of several machines or operations can readily strike the percentage that such a total gives to their direct labor. In such cases the first preliminary application of the formula might indicate the use of a press which would take a different percentage overhead than first used so that it would merely require a second use of the formula where the more accurate overhead figures would be substituted.

In plants where the wage scale and percentage overhead used in estimating prices are considered as constant for a period of time the formula further simplifies into:

$$Y = \sqrt{\frac{K \times C \times Q}{U}}$$

$$\text{Where: } K = \frac{W\,(100 + \%O.H.)}{6}$$

For example, where the sum total of overhead as mentioned above is 212.5% and say the wage rate is $.50 per hour then K = 26.04. Such a factor once established in any plant would then only be changed when a new overhead or wage rate or both were adopted.

Following through an example from using actual factors which might ordinarily arise such as the proper sized mold for a heater plug shell half where the unit cavity cost in a production mold is approximately $60.00. Applying say an estimated rate of molding of 25 heats per hour or a cycle of 2.4 minutes and considering a total quantity of 100 parts as all that will be used, we find:

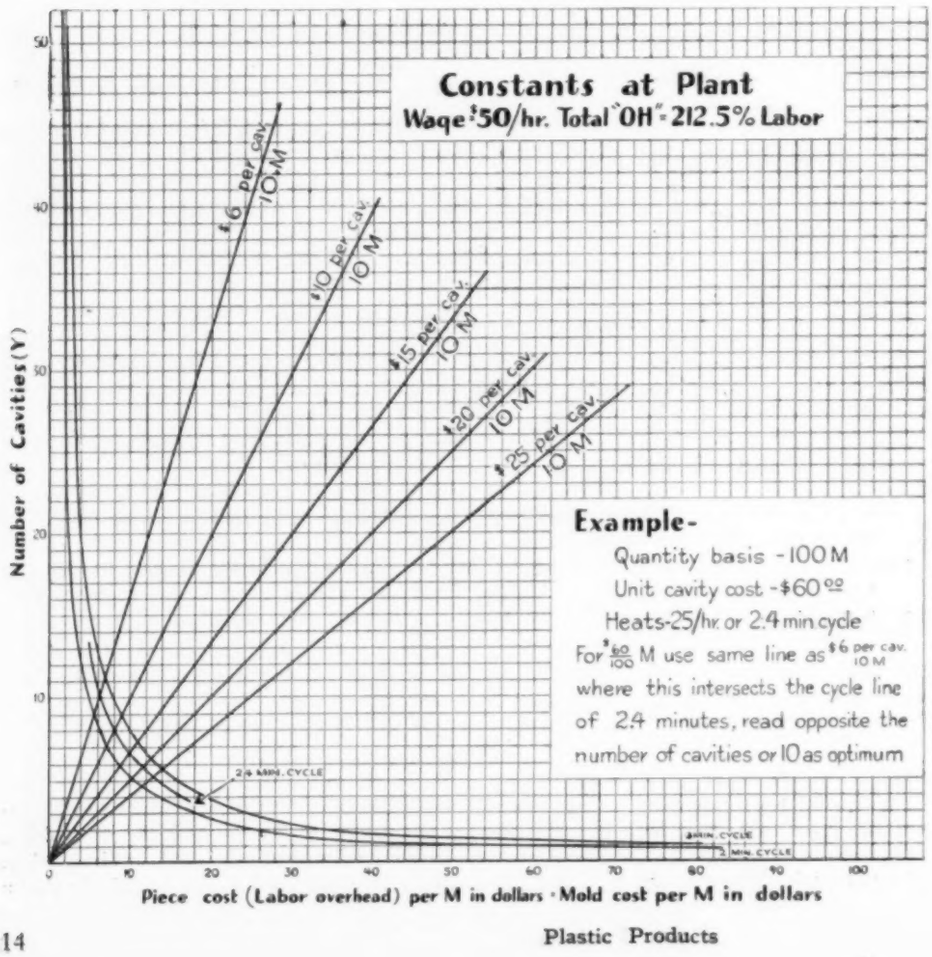
$$Y = \sqrt{\frac{26.04 \times 2.4 \times 100}{60}} = \sqrt{104.16} = 10.4 \text{ or } 10 \text{ cavities.}$$

In the above example proof that this is the optimum mold size is readily shown because the mold will cost 10 × $60.00 or $600.00, and the labor and overhead also equals approximately this amount for 100 parts. The total of the two or approximately $1200.00 is the smallest amount under the given conditions of any total that can be derived from using either a larger or smaller mold, hence the optimum mold size for 100 parts.

No serious unbalancing occurs if convenience of mold layout dictates either nine or twelve cavities. To get further away from the optimum size will probably not be necessary. Where quantities might run very high, as into the millions, the calculated mold size might become out of range from the practical molding angle, and then the answer is simply the largest practical mold that can be operated most economically.

It is often desirable for the purchaser to consider charging off his mold investment on his own books over a period of a year or two. Consequently if the purchaser's real interest is to eventually use say 500,000 parts a year or has his plans set for this amount as reasonable, although ordering only in maximum lots of 100,000, the molder should take this into consideration by calling the purchaser's attention to the economy of the situation and base his recommendations of the proper mold size accordingly.

As will be seen the relation between mold size and quantities is not a direct proportion but directly as the square root of the quantity, the cycle, the wages with overhead and the reciprocal of the unit cavity cost. For a rough approximation of the proper mold size when required by the sales engineer in the field, a constant K_2 or K_3 can be previously worked out and kept in mind for say the usual range of 2 and 3 minute cycles such that when a given quantity is being discussed a simple mental calculation gives a tentative figure of mold size and even approximate cost that usually paves the way for future accurate prices in a rather illuminating manner.


Constants at Plant
Waqe $.50/hr. Total "OH" 212.5% Labor
$6 per cav. 10 M
$10 per cav. 10 M
$15 per cav. 10 M
$20 per cav. 10 M
$25 per cav. 10 M
Example-
Quantity basis - 100 M
Unit cavity cost - $60.00
Heats-25/hr. or 2.4 min. cycle
For $60/100 M use same line as $6 per cav. 10 M where this intersects the cycle line of 2.4 minutes, read opposite the number of cavities or 10 as optimum
2.4 MIN. CYCLE
3 MIN. CYCLE
2 MIN. CYCLE
Number of Cavities (Y)
0
10
20
30
40
50
60
70
80
90
100
Piece cost (Labor overhead) per M in dollars - Mold cost per M in dollars

In our example above K_2 (for a 2 minute cycle) becomes approximately 7 and K_3 approximately 9. Therefore all is left to determine in the field mentally is the square root of the quantity in thousands (or 100) divided by the unit cavity cost (or 60). This is readily seen to be practically 1.3 and the answer for a two minute cycle is nine cavities or cost of between $500 or $600. If it is considered the piece will take a 3 minute cycle the number of cavities would be twelve or a cost of between $700 or $800 as the mold investment.

After a few trial calculations it will be found rather a coincident that lots of one thousand never require for economy more than a one cavity mold, that for 5 thousand lots nearly always a four cavity mold is the size for the average part. When the quantities are over a million the limit of mold size is determined by the largest number of cavities that can be put in the largest press available.

In this method, as also by formula, the basis of determining the optimum mold size is

when the cost of the total number of parts equals the mold cost. We can consequently construct a chart for any given overhead and wage rate that might apply in a specific plant, made up of two sets of curves. One set applies to the "parts cost" vs. "number of cavities" for any given cycle and the other set covers the mold cost vs. "number of cavities" plotted for various quantities. Where these curves intersect for a given set of conditions will indicate the optimum mold size for these conditions.

Such a chart, once drawn, to meet the specific conditions of wage and overhead in a plant makes formulae calculations unnecessary and the results desired quickly obtainable. Such charts were constructed by the writer about seven years ago and have been used constantly in estimating with much time saving results.

A sample chart is worked out herewith for a given set of typical plant conditions where the labor is $.50 per hour and with plant overhead of 150%. Additional factors that are used in arriving at the final cost makes the "O.H." figures equal to 212.5% of the labor. The conditions are constant enough to warrant making up a chart with sets of curves. The formula for the parts cost vs. number of cavities curve takes the general shape of $PY = K$ where P represents price cost per thousand as far as labor and overhead is concerned. Y is the number of cavities and K a constant resulting from plant conditions of wage rate and overhead.

In determining P or price cost per thousand, we select the cycle in minutes also as a constant of the curve in question such as 2 or 3 minutes and with the other factory constants of wages and overhead applying which we find exists at the plant, we list in table form a few of the points on the curves as illustrated.

PRICE COST IN DOLLARS VS. NUMBER OF CAVITIES

	Number of Cavities or Values of Y						
Cycle	1	5	10	15	20	25	
2 Minutes.....	52.08	10.41	5.21	3.47	2.60	2.08	etc.
3 Minutes.....	78.13	15.63	7.81	5.21	3.90	3.12	etc.
4 Minutes.....	etc.						

2 Minute Cycle:

$$P = \frac{W\left(\frac{100 + \%O.H.}{100}\right)1000}{\frac{60}{C} \times Y} = \frac{52.08}{Y}$$

If the number of cavities = 1 then P = 52.08
If the number of cavities = 5 then P = 10.41
If the number of cavities = 10 then P = 5.21
If the number of cavities = 15 then P = 3.47
If the number of cavities = 20 then P = 2.60
If the number of cavities = 25 then P = 2.08

3 Minute Cycle:

$$P = \frac{78.13}{Y}$$

If the number of cavities = 1 then P = 78.13
If the number of cavities = 5 then P = 15.63
If the number of cavities = 10 then P = 7.81
If the number of cavities = 15 then P = 5.21
If the number of cavities = 20 then P = 3.90
If the number of cavities = 25 then P = 3.12

The above tables yield a curve for each of a 2 and 3 minute cycle condition and can be expanded to make as many curves for the various cycles and cavities as desired. In our sample chart we have plotted these values for each of the 2 and 3 minute cycles merely as illustrative.

The other set of curves which are straight lines take the general shape of $(DQ = UY)$ where D equals total mold cost divided by the quantity desired in thousands, Y equals the number of cavities, U the unit cavity cost and Q the quantity desired in thousands. Since we have made the condition that the mold cost per thousand shall equal the price cost per thousand, we can consider our values of D on chart the same as the P values on our first set of curves and then plot a series of straight lines for given values of unit cavities against mold cost per thousand and we derive the following values to plot.

VALUES OF Y OR NUMBER OF CAVITIES
(Basis 10M parts)

Values of	Unit Cavity Costs				
D or P.....	$6	$10	$15	$20	$25 etc.
$3.00	5	3	2	1.5	1.2
$24.00	40	24	16	12	9.6
$30.00	50	30	20	15	12
etc.					

Since in working out values in above table $P = D = \frac{UY}{q}$ we let Q equal any amount, say 10M. Then $Y = \frac{10\,P}{u}$. Also take for unit cavity cost or U any value such as $10.00, then Y = P or a curve whose value of Y or number of cavities always equals the price cost (Labor + Overhead) per thousand.

Now if we use a quantity basis of 20M and a unit cavity cost of $20.00 we find this combination results in the same curve as the first and likewise if a 30M quantity and a $30.00 unit cavity cost is used. We can then designate our curve to a variety of combinations where the quantity in thousands equals the unit cavity cost in dollars, such curve being $\frac{D}{Y} = 1$. For convenience we will designate this line as $\frac{\$10 \text{ per cavity}}{10M}$.

In order to have a series of straight lines to cover a variety of conditions where the values are not alike, we work out say a curve where the quantity is still 10M but the unit cavity cost is $15.00. Then the values of D or P are always 1.5 times the number of cavities or $\frac{D}{Y} = 1.5$. This line we will designate $\frac{\$15.00 \text{ per cavity}}{10\,M}$. We thus construct any number of straight lines which merely lay at different angles such as a condition of $\frac{\$20.00 \text{ per cavity}}{10\,M}$ where $\frac{D}{Y} = 2$ and so on.

We also draw curves or straight lines for values below $10.00 per cavity unit cavity cost on the basis of 10M quantity and thus provide for all conditions. If the quantity is 100M and the unit cavity cost is $50.00 we find we come back to the same as the $\frac{\$5.00 \text{ per cavity}}{10M}$ line and for 200M with unit cavity cost at $40.00, we employ the $\frac{\$2.00 \text{ per cavity}}{10M}$ line or curve.

On our sample chart we will then see a series of hyperbolas for as many constant cycle conditions as we choose, in this case one for a 2 minute, one for a 2.4 minute, and one for a 3 minute condition. There will also be a series of straight

lines for various combinations of $\frac{\text{unit cavity costs}}{\text{10M}}$ as in this case the form covering $6.00, $10.00, $15.00, $20.00 and $25.00 plotted against mold cost per thousand or parts cost and values of number of cavities. Then to read direct the optimum number of cavities in our previous example of a 2.4 minute cycle, a quantity of 100M from a mold whose unit cavity cost is $60.00, we note where the 2.4 minute cycle curve would meet the $\frac{\text{\$6.00 per cavity}}{\text{10M}}$ line and read opposite the nearest whole number of cavities or ten.

It will be seen that the accompanying sample chart, of which a similar one with different plant constants of labor and "O.H." are used, when constructed, gives a quick value of the optimum mold size for any part whose quantities are desired or known and where a fairly close estimate of unit cavity cost can be approximated. Even when it is found that we had used an approximate estimate of $40.00 per cavity for example as unit cost and this called for a 20 cavity mold and when the actual cost for a 20 cavity mold was determined was found to average $60.00 per cavity, we merely go back into our chart on the $50.00 basis and find a slightly smaller mold of 18 cavities is proper.

One conclusion is evident from a study of these variables that the lower the mold cost or unit cavity cost the larger will become the proper size of the mold with consequent lower piece cost, hence the ultimate importance of low mold costs to compete successfully.

Cellulose Finishes for Leather

By H. Anderson and M. C. Lamb

THE application of nitro-cellulose finishes to leather involves a considerable number of drawbacks and objections—for example, inflammability,—but the difficulty of obtaining fastness to rubbing of pigment finishes and dyestuffs when applied to leather has forced the leather manufacturer to resort to use of nitro-cellulose finishes as the only means of obtaining a sufficiently reliable finished result devoid of this defect of color looseness.

The important requirements in a cellulose finish for leather may be enumerated as follows: (1) pliability, (2) elasticity, (3) clarity and brightness of film, (4) hard surface, (5) gloss, and (6) permanence on exposure to light.

Drawbacks to Castor Oil

One of the most important ingredients in a finish is the plasticizer or softening agent. Until some years ago, the most commonly employed plasticizer was castor oil. The chief objection to castor oil as a plasticizer in cellulose finishes to be applied to leather is its liability to absorption by the leather to which it is applied. A considerable number of difficulties experienced in connection with nitro-cellulose finishes can be ascribed to this cause. One common defect is its liability to "peel". In the majority of cases this is due to the castor oil diffusing from the cellulose film into the leather, leaving the cellulose a hard and brittle film, easily removable from the surface of the leather by the least possible aggravation.

Experimental Method

A standard solution of cotton 8A was made by dissolving 30 grammes of cotton in 500 c.c. of butyl acetate and diluting the solution with 500 c.c. of butyl alcohol. Liquid plasticizers were added in the following amounts, by volume, to a measured volume of the standard cotton solution: 0.25 per cent., 0.5 per cent., 1.0 per cent., 1.5 per cent., 2.0 per cent. Solid plasticizers were added in similar quantities by weight. The various plasticized solutions were poured on to glass slides, the slides were dried and exposed to a mercury vapor lamp for five hours. Half of each slide was protected from the lamp's rays. The lacquer films were subsequently stripped off the slides, examined, and mounted. In no case was a film observed to have suffered any appreciable loss in elasticity, although it had been subject to the intense action of ultra violet light, considerable heat from the lamp, and the action of ozone generated by the passage of the rays through the air.

Glyceryl tribenzoate is a brownish white crystalline solid. It melts at about 71° C., and is rather difficult to dissolve. It gives moderately pliable films, easily discolored by light.

Ethyl glycol phthalate is a light brown transparent gelatinous substance which should be carefully powdered before dissolving. It is best dissolved by adding the solvent gradually to the powdered material and stirring thoroughly after each addition. It gives a slightly more pliable film than glyceryl tribenzoate, but this is also badly discolored on exposure. It is known industrially as "Softener P.A." and "Cellosolve Phthalate."

Blown castor oil is a dark colored oil, and, consequently, although the film is not greatly affected by light, it is slightly colored by the oil. It yields a fairly pliable and slightly soft film. Triacetin is a very good plasticizer, and yields very soft, pliable films. It is to be strongly recommended for use on very stretchy leathers. It gives films which are very fast to light. Triacetin has a boiling point of 258° C., it is not miscible with petroleum hydrocarbons, but it is completely miscible with aromatic hydrocarbons.

Sipalin AOM yields very tough, pliable films, practically unaffected by exposure. It is extremely stable, and its boiling point at atmospheric pressure has not been determined. At 12 m.m. pressure it has a boiling point of 230° C. Of all the plasticizers examined, this material undoubtedly displays the best properties.

Dibutyl phthalate is sold under the trade names of "Palatinol C" and "Elaol". It has a boiling point of about 325° C. It yields very pliable films, practically unaffected by exposure, but it is rather volatile and tends to evaporate out of the film in course of time.

Barkite and the Triaryl Phosphates

Triphenyl phosphate is a white, crystalline, easily soluble solid, known commercially as "T.P.P.," "Altai," and "Kronelyne." It has a slight tendency to crystallize out of the film, but this can be corrected by the addition of a very small amount of almost any other plasticizer, the best for the purpose being diamyl phthalate. This is only necessary when high proportions of the phosphate are being used. It yields good pliable films, which are rather soft, and only moderately discolored by light.

Barkite and Barkite B are, respectively, the oxalic esters of methyl and dimethyl cyclohexanone. They are colorless liquids, giving strong pliable films which are only slightly discolored by exposure. These materials have a very good wetting power for pigments.

Tricresyl phosphate is a heavy liquid, known commercially as "T.C.P.," "Plastic X," and "Lindol". It has a boiling range of 430° C. to 440° C. It is a very stable ester, and does not develop acidity. It may be used up to 100 per cent. of the weight of cellulose nitrate. It gives fairly pliable films, but is rather badly discolored by exposure. It gives a more pliable film in conjunction with a little castor oil. One of the disadvantages of tricresyl phosphate is that it is easily affected on exposure to light. This is a somewhat disastrous defect, especially when the application is made to light colored or white leathers; indeed, its application to any leather results in a material alteration in color when the leather is in use, and consequently is, of course, objectionable. *Abstract from the Leather World.*

Training British Plastic Molders in England

by Dr. E. C. Pickering

Head of Chemistry Department, Borough Polytechnic Institute, London

IN AMERICA people are trained to be most anything from a policeman to a civil engineer. American colleges, business and trade schools embrace every sort of apprenticeship and profession, and regardless in which branch of industry one wishes to become adept—be it candy-making, clerk, chauffeur, electrician—one can always find a school that offers the necessary knowledge and training. In America also is an industry that within the last few years has taken great strides in its scope and that promises by 1940 to develop into one of startling proportions and adaptability, yet never a thought has been given to the need of training helpers for the plastics industry. If this expansion grows and the expected upturn in business arrives, in which event skilled workers will be at a premium, it will be necessary for a manufacturer to call in experienced help, just as an office executive demands a trained stenographer or typist. He will find it imperative, as his business expands, to have skilled labor at hand, men who can sit down at his machines and presses and know something of the process and product they are to bring to perfection, and who will bring new ideas with their training.

In England, where rapid progress has been accomplished in the development of the plastics industries, serious consideration of this subject resulted in a complete course being instituted at the Borough Polytechnic, which covers in detail all the various phases of this work, and the course as herewith described by Dr. Pickering offers much food for thought on this side of the Atlantic.

The first attempt to deal with the question of technical education in connection with the plastics industry was made in January, 1930, when a course of lectures was arranged relating to the different types of molding materials which appeared to be coming into prominence, such as phenol-formaldehyde, urea-formaldehyde, casein and cellulose plastics. The lectures were given by men holding prominent positions in firms actually dealing with the particular product concerned. About one hundred attended these lectures and the interest shown decided the authorities at the Borough Polytechnic to go ahead with arrangements for providing instruction in the technology of plastics. A small laboratory was equipped with hydraulic presses and other apparatus and a lecture course, followed by practical work, was arranged in the session 1931-1932.

The present laboratory is a much more spacious and convenient one. In addition to the usual chemical laboratory benches and apparatus for small scale experiments, the following plant is available for the manufacture of resins and the preparation and testing of molding compositions. A digester and still of about one gallon capacity used in the preparation of phenol-formaldehyde resins; a Bridge-Banbury Mixer for 2-3 lbs. batches of molding powder; a Baker Perkins steam-heated Universal Mixer; ball mills of various sizes; a Harrison-Carter Disintegrator used for breaking down pulp and some powders; two hydraulic presses; an injection molding machine; small grinders of the coffee mill type, polishing mops, etc. In addition, various other mills normally used by the paint manufacturing students are also available when necessary. All the usual operations in connection with resin manufacture and the preparation and use of molding compositions can, therefore, be dealt with on a small works scale. Some very good compositions have been made by the students in the practical classes.

Up to the present session, the course has consisted of a class held one evening a week throughout the winter session and comprising a lecture of one hour's duration, followed by practical work for two hours. The scope of the lecture course is indicated by the following:

Outline Syllabus:—Lecture Course.

The manufacture of synthetic resins including phenol-formaldehyde, urea-formaldehyde, glyptal resins, etc. The production of molding compositions from synthetic resins. The use of plasticizers, accelerators, fillers and fluxes. Thermoplastics and the manufacture of shellac compounds for gramaphone records. Pitch and bituminous compounds with special reference to battery box manufacture. Celluloid and xylonite, etc. Clay, fireproof and porcelain materials. Carbon mixings and carbon brush manufacture. The theory of molding both hot and cold, design of molds, mold materials, molding plant and equipment. The properties of moldings. Methods of test and testing.

Outline Syllabus:—Practical Course.

Hydraulic plant and equipment, the heating of molds and presses, plant maintenance, mold design for the different types of moldings and compounds, cold molding, hot molding, automatic molding; operations subsequent to molding, i.e., stoving, finishing and spraying; the detection and cure of common defects in moldings, the reduction of the time cycle and finishing costs, inserts, inspecting and testing of moldings.

The practical course will also include instruction in the manufacture of the molding compounds—phenol-formaldehyde, urea-formaldehyde, etc. The choice and use of fillers, fluxes, accelerators and coloring matter.

During the present session, the scope of instruction in plastics and related subjects has extended considerably. In the Engineering Department of the Borough Polytechnic, a special class has been arranged on the subject of Mold Design and Manufacture, the following syllabus being covered:

Syllabus

Types of press—hydraulic and double toggle lever. Classification of molds—plunger, positive, positive flash, flash or open molds. Types such as hand operated, semi-automatic, automatic; single and multiple impression molds. Molds for injection methods of molding; interchangeability of tools and parts; locating; loading and ejecting devices.

Gas, steam and electric heaters; steam-heated and water-cooled molds.

Molding characteristics of various plastics; materials for mold construction; relative merits of straight carbon alloy and

case-hardening steels. Heat treatment; finishes; plating of molds.

Design and drawing of molds for various components. Methods of locating and holding metal inserts. Molded threads and holes. Application of hobbing in manufacture. Alternative methods of manufacturing with consideration of relative costs of production.

Machining operations on non-metallic materials, polishing, grinding, milling, drilling, tapping and turning.

Workshop Practice (Syllabus 38p)

Mondays or Tuesdays, 7-9.30 or 7.15-9.45 p. m.

Members of the class in Design and Manufacture of Molds for the Plastics Industry are advised also to take Workshop Practice, when they will be able to make and try out molds for special purposes.

The Chemistry and Electrical Engineering Departments have also combined in an effort to provide equipment for the testing of resins and molded articles and a second year course is being arranged in which this aspect of the subject will be the principal part of the curriculum. The apparatus installed in the Electrical Department is of special interest, including equipment for the measurement of the insulation resistance of specimens at various temperatures, the permittivity or dielectric constant of the material, and the breakdown voltage or electric strength under various conditions of atmospheric temperature and humidity. The apparatus for the last-mentioned test is of special interest and was described in the "*Electrical Times*" of August 10th, 1925. Discs of the material are inserted between parallel plates electrodes contained in an oven, the temperature of which can be adjusted, regulated and maintained at any value up to 300° C., within about one degree. By means of a 200/50,000 volt transformer the pressure between the electrodes can be adjusted to any value up to the maximum secondary voltage of the transformer. The regulation of the voltage is admirably carried out by means of a special moving coil regulator which enables the changes in voltage to be effected gradually. A three range voltmeter 0-12.5 k. v., 0-25 k. v., 0-50 k. v. enables the voltage to be measured with a high degree of accuracy. The equipment also includes a standard sphere gap for measuring the peak voltage and an electrostatic voltmeter. The plant is enclosed in an expanded metal enclosure which is earthed and the door is both electrically and mechanically interlocked, so as to ensure the safety of the observer.

In the Chemistry Department, the necessary conditioning chambers and electrically-heated ovens have been installed and a special set of tools for molding standard test pieces has been prepared.

From the point of view of the educational authorities, the expenditure and time spent on this subject has been justified, since at least thirty students have attended the courses in each session. As the industry is a rapidly expanding one, it is reasonable to assume that the number requiring this form of instruction will be considerably larger in the future. There is also a growing recognition in the industry itself of the necessity for a well-thought-out scheme of technical education and there is little doubt that, as soon as some of the more urgent practical problems necessarily associated with a young industry have been solved, this matter will receive a good deal of attention.

Borough Polytechnic Institute

BOROUGH ROAD, LONDON, S.E.1.

(Five Minutes by Car from Southwark, Blackfriars, Waterloo, Westminster and London Bridges)

Synthetic Resins, Moulding Powders and Plastic Materials

Wednesdays, 7.30-8.30 p.m. Commencing Wednesday, 22nd January, 1930.

A course of lectures dealing with the methods of manufacture, properties, uses and future possibilities of the various types of synthetic resins and plastic materials.

The lectures will be given by experts actively engaged in the manufacture or use of the different products.

PROGRAMME OF LECTURE COURSE.

		Lecturer.
22nd January ...	Thiourea-formaldehyde resins ...	A. V. KELLER, F.C.S., M.Int.P.I., of Messrs. Kelacoma, Ltd.
29th January ..	Phenol-formaldehyde resins ...	H. V. POTTER, B.Sc., of The Bakelite Co. LTD.
5th February ...	Casein Plastics	R. DODD, B.Sc. of Messrs. Erinoid, Ltd.
12th February ...	Nitro-cellulose and cellulose acetate Plastics	J. E. BEARD, of Messrs. A. F. Hughes & Co.
19th February ...	Methods of Moulding, Moulds and Moulding Machinery	A. V. KELLER, F.C.S.
26th February ...	Liquid Cements and Binders ...	J. TAYLOR, B.Sc., of Messrs. Kelacoma, Ltd.
12th March	Glyptals	H. WARREN, of Messrs. British Thomson-Houston Co., Ltd.

Also lectures on **Coumarone and Indene Resins, Furfural Resins, Artificial Glass, etc.** Dates and lecturers to be announced later.

FEES FOR THE COURSE.

	Under 18	Over 18
For the Lecture Course	**10/-**	**20/-**

(Unless vouchers are produced students residing outside the County of London are charged higher fees. See Special Pamphlet.)

For forms and further particulars apply to the undersigned. As the accommodation is limited, application should be made not later than January 18th.

J. W. BISPHAM, *Principal.*

"Selling Below Cost" Provisions of the NRA

By Eric A. Camman, C.P.A.*
Partner, Peat, Marwick, Mitchell & Co.

A MAJORITY of the approved codes, numbering upwards of 350, contain accounting provisions, and most of these include a clause prohibiting sales below cost. Very few of these clauses are worded alike, but in essence they state that it shall be regarded an unfair method of competition to sell goods at prices or upon terms that will result in the buyer paying less than the cost of those goods. This sounds like a simple statement of a sensible course which any business man should want to follow. But the problem really is not as simple as this, and much confusion prevails at present about these clauses.

One thing which contributes to this confusion is a wide diversity in definition of what is cost. Most of the codes which contain selling-below-cost clauses leave the question what is cost to be determined in accordance with a standard method of accounting later to be set up as a model or guide for the industry. Other codes, however, do attempt to define what shall be included in cost, and a comparison between these definitions shows a perplexing dissimilarity far beyond any differences naturally to be looked for between industries. The definitions of cost range all the way from bare prime cost, that is, the cost of materials and labor, at one extreme, to the entire cost of producing, shipping and selling, that is to say, the total cost up to the point of delivering the goods to the buyer, at the other extreme. In between there are many different definitions of just what shall go into cost and what shall be left out. When the layman reads these various descriptions, apparently all of the same thing and apparently all authoritative, inasmuch as they are written into law, he could conceivably say with Alice, in the famous trial of the Knave of Hearts, "If any one of them can explain it, I'll give him six-pence. I don't believe there's an atom of meaning in it." The matter could be closed upon the reasoning of the King of Hearts who replied, "If there's no meaning in it, that saves a world of trouble, you know, as we needn't try to find any," were it not for the fact that in reality there is a meaning and a purpose in selling-below-cost clauses which is important.

The object of putting clauses against selling below cost into codes is to try to stop the destructive effects of reckless price-cutting which have been experienced in recent years. We all know how costly and discouraging, industrially and socially, has been the ruthless price struggle to obtain the continually diminishing business. Therefore it is really worth while, if selling-below-cost clauses can be made one of the instruments to prevent recurrence of this evil, that they be studied and perfected. In my opinion, such clauses in conjunction with sound cost accounting procedure will become highly useful to accomplish this end. In order to bring it about, however, the form of many of the present selling-below-cost clauses must be changed.

For instance, the majority of such clauses now state that no member of an industry may sell below his own individual cost. This looks all right in theory but can not be carried out in practice. It would be nice if every business man could be compelled to make a profit by law. Literally applied, however, this would mean that the majority in an industry could not quote for business against lower prices which are possible to the lowest cost producers. The wording is too restrictive and leaves no alternative that would permit attaining the desired end through the operation of sound economic forces. In other codes the truth of this has been recognized, for we find that the clauses against selling below cost are qualified to permit exceptions to meet competing prices when necessary. Under this wording, a manufacturer is not stopped from competing for business because his costs are high, but is led to become more efficient and bring his costs down if he wants to stay in business and avoid losses.

Even this qualification, to meet other legitimate prices on similar goods, alone is not sufficient. Further exceptions will be needed. For example, every business man knows that there are times when it is necessary to sell obsolete or perishable goods, or seconds, dropped patterns, job lots, and so forth, at prices that will be sufficiently attractive to dispose of them, which may be actually below cost. There are times when it is necessary to liquidate inventories. There are cases when the introduction of a new product may have to be made at a loss at first. All of these exceptions may be valid at times for good business reasons, and their validity can not be denied by their omission from these clauses.

Now, if it is clear that clauses against selling below cost must be worded so as to permit certain exceptions, and so as to permit meeting the prices of competitors, it will be seen that the effect would be free competition as heretofore but with the stipulation in addition of a lower limit on prices. This lower limit would soon come to be the cost of the lowest cost producer in the industry. The application of this principle thus would result in establishing a fair minimum, or floor, for selling prices, based upon cost. That, after all, is what we are trying to accomplish. The business man who legitimately can offer a lower price is economically more efficient than his competitor. The competitors will be forced to become more efficient, or else to offer something in the way of quality or service that will sustain a higher price. The consumer will pay a fair price and all interests will be equitably served. The chiseler will be outlawed by other clauses in codes, relating to wages, hours, employment and trade practices, which are designed to prevent him from cutting prices and taking the difference out of labor or quality.

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* *An address before N. Y. Chapter, National Association of Cost Accountants.*

Through this reasoning, I have recommended the following wording for selling-below-cost clauses:

> "Products or services shall not be sold or exchanged at less than the lowest present cost to any member of the industry subject to this code for products or services of equivalent type, quality or performance, such cost to be computed according to the principles of the standard method of cost accounting adopted and approved pursuant to Article —— hereof with such restrictions or adjustments as are indicated in a Cost Formula which shall be prescribed by the Code Authority and approved by the Administrator; provided, however, that exceptions in the application of this Article may be authorized by the Code Authority subject to review by the Administrator."

This wording, as you will see, is direct and as simple as it can be made while covering the ground. It provides a bottom below which selling prices shall not be cut, and does this without sacrificing the social benefits of fair free competition. At the same time, it permits reasonable exceptions when they are justified. I think these provisions should meet all the requirements.

It should be added that, in my opinion, it is desirable to have in addition to such a selling-below-cost clause, another clause providing for the filing of prices centrally with some confidential agency. This, which is referred to as the open price plan, has recently been subjected to some criticism on the ground that it leads to price fixing and uniform prices. In any case in which such criticisms are justified, it appears to me they should be directed not at the open price plan but at the abuse of it. Employers can not pay higher wages and employ more people unless some means can be devised that will safeguard them against disruption of prices. The open price plan, coupled with a selling-below-cost clause, offers promise of going a long way toward this end, and if the whole machinery rests upon the firm foundation of sound methods of cost accounting it should be possible to keep it from going awry or being misdirected. To hold that this is impossible would be equivalent to admitting that we have exhausted American resourcefulness and ingenuity, which, I trust you will agree with me, is far from being the case.

Cellulose Nitroacetates

Attempts to nitrate cellulose acetate or to acetylate nitrocellulose or even to effect simultaneous acetylation and nitration of cellulose have invariably led to unsatisfactory products. With growing recognition of the respective good qualities of nitrocellulose and cellulose acetate it was but natural that attention should be directed to the possibility of satisfactorily combining them in a single substance. That attempts to achieve this object have been dogged with failure may be accounted for by the fundamentally divergent esterifying actions of nitric and acetic acids. From a recent survey of the patent literature one gathers that the so-called cellulose nitroacetates are deficient, either in chemical stability or in satisfactory solubility properties. Attention is drawn for example, to F. P. 529,173, which refers to the production of a difficultly inflammable horn-like mass by successively immersing cellulose in sulfuric-nitric acid mixture and acetic acid-acetic anhydride mixture. The second stage is said to be catalytically promoted by phosphoric acid. Although the product possessed good water-resistance and resembled normal nitrocellulose in being compatible with camphor, its limited solubility formed a serious obstacle to general use. Among the common solvents benzol was the only one possessing solvent power. It was insoluble in acetone and alcohol-ether.

More recent research has led to the interesting discovery that very moderate "nitration" of cellulose converts it into a form which lends itself to acetylation without the necessity for employing the usual drastic acetylating agents. In this way the solubility properties of the new acetate are frequently similar to those of pure cellulose acetate, even with the low nitrogen content of 0.01 per cent. Most of the products obtained by the new process contain approximately 1.5 per cent. nitrogen, so that it would be definitely misleading to describe them as nitroacetates. It is usual to expose the cellulose to nitric acid vapor prior to acetylation, and the products form clear solutions of low viscosity. One of the more recent processes (G. P. 550,119) leads to a product with a nitrogen content of 0.75 to 0.45 per cent. when working with phosphoric acid as a catalyst and an organic acid as the diluent. It is claimed that the formation of hydrocellulose is avoided, the acetylation proceeding uniformly under the influence of the catalyst.

The value of preliminary nitric acid treatment of the fibre is stressed in G. P. 562,386, in that the period of acetylation and the cost of materials are considerably reduced. A larger percentage of acetyl is also taken up by the cellulose. Whereas untreated cellulose only takes up a maximum of six to eight per cent. acetyl after boiling with glacial acetic acid for 150-200 hours, a cellulose which is treated in the above manner is capable of combining with 13-15 per cent. acetyl. Further evidence of the technical importance of those cellulose "nitroacetates" containing a minute proportion of nitrogen is provided in G. P. 563,966, which obtains technically interesting products containing not more than 0.1 per cent. nitrogen by acetylating in the presence of ammonium nitrate and urea.

Polyalcohol Resins from Germany

Prepare resinous products by condensing polyalcohols, partially esterified by fatty acids, with phenols and then treating the product with formol. As an example, the monoester of glycerine and lauric acid condensed with ordinary phenol in the presence of zinc chloride, treated with trioxymethylene to obtain a mass particularly soluble for use in the varnish industry.—German Patent 576,714.

In the manufacture of resin from polyalcohols and polybasic acids or their anhydrides (phthalic acid), add an aminocarboxylic acid any time before definite transformation. This animated acid may be obtained in situ by the action of monochloracetic acid on aniline. Use 0.25 to 0.75 molecules of aminated acid per molecule of polyalcohol. The resins obtained are grey or blue and have interesting mechanical and electrical properties. The color may be modified by a later treatment with bromine.—Ger. Pat. 582,164.

Colored Synthetic Resins

Vat dyes of the indigo or anthraquinone series may be dissolved in the resin or may be added to the finished product as powders; they may even be melted with phenol and the mass then condensed with formol. Appropriate dyes are bis-1,2-naphthothionindigo or 2-thionaphthene—2' acenaphthene indigo.—Ger. Pat. 585,961.

This Month's Cover

Cellophane enters the realm of fashion with a distinctive new hat, glove, and handbag ensemble of jet black Cellophane, designed by Louise Sanders. Both the gloves and handbag feature a large composition ball and loop closing. Photograph, courtesy Du Pont Cellophane Company.

Plastics in Pictures

The newest recruit to the plastics ranks is the La Cross Nail Polish Kit, a merchandising move which would have been impossible before the days of molded plastics. Case holds polish and remover, together with implements and the exclusive La Cross dropper-applicator for the polish. Hinged cover of green plastic material is of Beetleware, the bottom section of shiny black Durez, the whole an unusually rich looking kit for dressing tables or traveling bags.

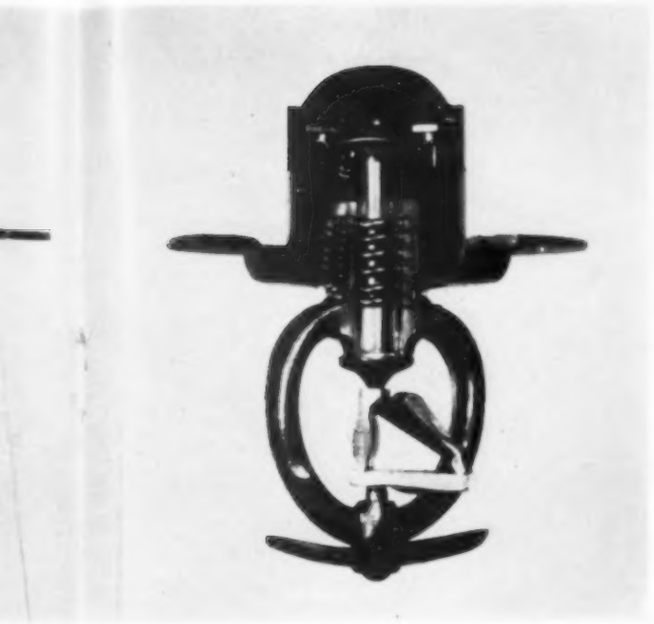
Woman's crowning glory in the smart mode of the season—a Dumas coiffure—is given an extra touch of smartness by the use of a graceful comb made of Pyralin which holds the swirls and ringlets in place.

Lucretia Vanderbilt has a number of delightful new beauty preparations, all priced at less than half a dollar, several of the containers being fitted with plastic closures into top of which is molded a dainty design and initials.

Time was when a gentleman went to buy a tie-clasp he had to help the saleslady rummage through a large cardboard box to find one which suited his fancy. Today, he steps to the counter and glances over an impressive displayer, made of Bakelite Molded, in a pleasing walnut effect, in which the clasps are displayed to decided advantage. The small, individual containers, also molded in a Bakelite material, slide in and out of the metal grooves, and offer the purchaser, after use, an ash tray or general utility bin.

Sprink-La-Stat, a new heat-actuated fire alarm sprinkler head as a new principle in sounding of pouring water on the blaze, it transmits a loud in museums, libraries, fur storage vaults, chemical would result in severe damage. Device is encl taking advantage not only of the excellent insu also of the economical production it offers, and of years in actual service. Manufactured by th

Molded door bumpers present an ideal plastics application, a story of which is given on page 33 of this issue. Graphite incorporated into the molding powder reduces the coefficient of friction and eases the entry of the wedge. Coil springs are imbedded in the non-blooming rubber cushions to lengthen their life, into which bosses on the molded blocks would fit.



-actuated fire alarm device, employs the solder type
nciple in sounding and automatic fire alarm. Instead
, it transmits a loud warning. Designed for installation
age vaults, chemical plants, etc., where water sprinkling
ge. Device is enclosed in a Bakelite Molded housing,
the excellent insulating qualities of the material, but
ction it offers, and its ability to stand up over a period
Manufactured by the Gamewell Company.

An unsual and dramatic merchandising strategy is this new shaving kit by Barbasol. Offered over the radio in return for an empty carton of the full-sized Barbasol package, the kit tends to keep the recipient using the cream while the company's blade business is automatically built up. Feature of the kit is the razor, in which Durez has been employed to give a husky, easily-gripped handle of extremely light weight and fine balance.

Closures are going up! The beautiful "High Hat" closure on this bottle is molded of lustrous, non-bleeding Plaskon (Toledo Synthetic Products) by the Armstrong Cork and Insulation Co.

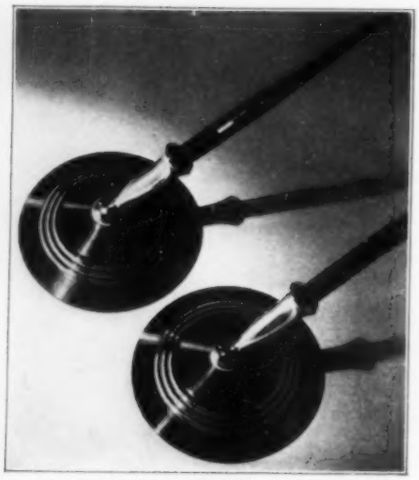
Molded screw caps of Durez for Palmer's soap dispensers are used to prevent discoloration and corrosion from contact with soapy water. Replacing plated metal covers, which were slippery and subject to chipping when dropped on hard surfaces, the molded caps screw on to bottle-type threads molded into the top of the soap bowl. The peculiar integral finish of molded plastics stays shiny for years, despite the corrosive action of chemicals.

WHATEVER YOU NEED IN A MATERIAL ★

★ PLASTICITY FOR INTRICATE SHAPES
This movie film developer reel required a material that could be fashioned into delicate, intricate design, and could withstand the action of developing chemicals. Durez did it . . . economically. Notice the imbedded inserts, the minute accuracy which was required for the thread of the film through the reel.

★ CHEMICAL INERTNESS This Telephone Sanitator presented a material-selection problem. The tube contains chemicals which damaged most materials tried. But after months of constant contact they did not affect Durez at all. Large drug manufacturers specify Durez for closures because their own chemists' tests proved Durez to be most chemically inert.

★ STRUCTURAL STRENGTH
This Bates Numbering Machine, molded of Durez, takes a terrific beating. But no matter how many thousands of times the knob is thumped . . . Durez won't show a sign of punishment.



★ BEAUTY Durez' smooth, lustrous finish is obtained right in the molding process. Many surfaces . . . shiny, dull, burled . . . may be had. And Durez is available in a complete line of colors.

★ DIELECTRIC STRENGTH
The use of Durez for case and arm mounting on this precision resistor saved assembly costs and made possible improved design. Because of Durez' high dielectric strength, it made other insulation unnecessary.

. . . YOU'LL FIND IT IN VERSATILE DUREZ!

We'll be glad to send you complete information on how Durez can help solve your own particular production problems. Write, General Plastics, Inc., 406 Walck Road, North Tonawanda, New York.

S: Solvent · SS: Solvent Softener · NSS: Nonsolvent Softener · P: Plasticizer

S = Solidifies or Melts · F = Flash Point

L = Latent Heat of Fusion · S = Specific Heat

Names	Formulae Emperical Structural	Mol Wt	Sp Gr.	D: Diluent	B: Boiling Point	Vapour Pressure	Critical T. Temp. P. Pressure	Viscosity Centipoises	V: Latent Heat of Vaporization	Capillary Constant	Refractive Index	Surface Tension
Ethylene Glycol Benzoate	$C_{16}H_{14}O_4$ $C_6H_5COOCH_2CH_2OCOC_6H_5$	270		P	S 71-4 [8] B 360 [2]							
Ethylene Glycol mono Benzyl Ether	$C_9H_{12}O_2$ $CH_2OHCH_2OCH_2C_6H_5$	126			B 132-8/15 [9]							
Ethylene Glycol mono Butyl Ether	$C_6H_{14}O_2$ $CH_2OH\cdot CH_2O(CH_2)_3CH_3$	118	0.9138 [4] 15/15	S	F 61 [4] B 170.6 [4]	0.85/20 [4]					1.4177 [7] 25°	
Ethylene Glycol di Butyl Ether	$C_{10}H_{22}O_2$ $CH_3(CH_2)_2OCH_2CH_2O(CH_2)_3CH_3$	174		S								
Ethylene Glycol mono Ethyl Ether	$C_4H_{10}O_2$ $CH_2OH\cdot CH_2OCH_2CH_3$	~ 90	0.935 [7]	S	F 40 [7] B 135.3 [7]	4.4/20 [4]					1.4042 [7] 25°	
Ethylene Glycol mono Ethyl Ether Acetate	$C_6H_{12}O_3$ $CH_3OCH_2CH_2\cdot CH_2OOCCH_3$	~ 132	0.9760 [4] 15/15	S	F 55 [4] B 183 [4]	1.24/20 [4]					1.4030 [7] 25°	31.8 [4] 25
Ethylene Glycol di Ethyl Ether.	$C_6H_{14}O_2$ $(CH_3CH_2OCH_2)_2$	118	0.848 [3]	S	B 123.5 [9]						1.3914 [31]	
Ethylene Glycol mono Methyl Ether	$C_3H_8O_2$ $CH_2OH\cdot CH_2OCH_3$	~ 76	0.969 [7] 15/15	S	F 32 [4] B 124.5 [7]	7.6/20 [4]					1.4025 [7] 25°	
Ethylene Glycol mono Methyl Ether Acetate	$C_5H_{10}O_3$ $CH_3COOCH_2CH_2OCH_3$	118		S	144 [23]							
Ethylene Glycol mono Methyl Ether Phthlate	$C_{14}H_{18}O_6$ $C_6H_4(COOCH_2CH_2OCH_3)_2$	282	1.17 [7]	SS	F 187 [25] B 230							
Ethylene Glycol di Methyl Ether	$C_4H_{10}O_2$ $CH_3OCH_2\cdot CH_2OCH_3$	~ 90	0.873 [7]	S	F 1.4 [7] B 84.5 [7]						1.3839 [7]	
Ethylene Glycol mono Phenyl Ether	$C_8H_{10}O_2$ $CH_2OH\cdot CH_2OC_6H_5$	114		SS	B 165/80 [10]							
Ethylene Glycol Phthlate	$C_{10}H_8O_4$ $C_6H_4(COOCH_2)_2$	192		SS								
Ethylene Glycol mono Propyl Ether	$C_5H_{12}O_2$ $CH_2OHCH_2O(CH_2)_2CH_3$	104	0.9135 [9]	S	B 151/748 [9]						1.4025 [31] 25	
Ethylene Glycol di Propyl Ether	$C_8H_{18}O_2$ $[CH_3O(CH_2)_2CH_2]_2$	146		S								
Ethylene Glycol Salicylate	$C_{16}H_{14}O_4$ $[HOC_6H_4COOCH_2]_2$	202		P	S 104. [8]							
Di Ethylene Glycol	$C_4H_{10}O_3$ $(CH_2OHCH_2OCH_2CH_2OH$	~ 106	1.132 [7]	D	S -10.5 [4] F 124 [4] B 250 [7]	0.01/20 [4]		.38/20 [31]	V 158 [4]		1.446 [7]	
Di Ethylene Glycol mono Acetate	$C_6H_{12}O_4$ $CH_2OH\cdot CH_2O\cdot CH_2\cdot CH_2OOC\cdot CH_3$	148		S								
Di Ethylene Glycol mono Butyl Ether	$C_8H_{18}O_3$ $CH_2OH\cdot CH_2OCH_2\cdot CH_2O(CH_2)_3CH_3$	162	0.940 [4] 15/15	S	S -16. [4] F 46. [7] B 222. [4]	0.02 [4] 20°					1.4190 [7] 25	
Di Ethylene Glycol mono Ethyl Ether	$C_6H_{14}O_3$ $CH_2OH\cdot CH_2O\cdot CH_2\cdot CH_2OCH_2CH_3$	134	0.9996 [4] 15/15	S	F 94 [4] B 198 [4]	0.13/20 [4]					1.3274 [7] 20°	
Di Ethylene di Oxide	$C_4H_8O_2$ $CH_2OCH_2\cdot CH_2OCH_2$	88	1.0418 [4] 15/15 [7] 1.0344 14.8	L.S.	S 11. [4] F 11. [4] B 100.8 [4]	29/20 [4]					1.422 [7] 25° 1.4224 [3] 16.5	
Tri Ethylene Glycol	$C_6H_{14}O_4$ $CH_2OH\cdot CH_2O(CH_2)_2O\cdot CH_2\cdot CH_2OH$	150	1.120 [4] 15/15	D	S -30 [31] F 165 [4] B 278 [4]	<0.1/20 [4]						
Ethylidene Acetone	C_5H_8O $CH_3CHCH\,CO\,CH_3$	~ 84	0.856 [7] 0.8577 19.6	S	B 124. [7]						1.43903 [7] 19.6	
Ethylidene Chloride	$C_2H_4Cl_2$ $CH_3\,CHCl_2$	~ 99	1.1743 [3]	D	S -96.7 [7] B 57.3 [7]	182.1 [9]/20		0.8129 [7]/21.84	1767/0 [7]		1.4166 [7] 1.4 16.85 [7]	20.13 [3]/87

Continuation of "Series on Solvents and Plasticizers" from June issue

ONE THOUSAND (1,000) ✓
or ONE MILLION (1,000,000) ✓

. . . any quantity, in any design . . .
you can count on absolute uniformity when molding

RESINOX

That is why molders are specifying RESINOX. Uniformity in molding often means the difference between profit and loss. Uniformity in Resinox is one thing the molder can rely upon.... Resinox molds perfectly and finishes with high luster, beauty, and strength. Resinox is odorless, water-and-alcohol-resistant, nonbleeding, and available in a wide variety of colors. For uniform molding results, insist upon *genuine* Resinox.

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Subsidiary of Commercial Solvents Corporation and Corn Products Refining Company, 230 Park Avenue, New York City

Molding Resins • Molding Compounds • Laminating Varnishes

KEEP IN TOUCH WITH RESINOX DEVELOPMENTS

FINE HEYDEN CHEMICALS

FORMALDEHYDE
PARA FORMALDEHYDE
HEXAMETHYLENAMINE

These products are especially adapted for use in Plastics. Their superior purity and always uniform strength yield plastic materials of dependable and uniform quality.

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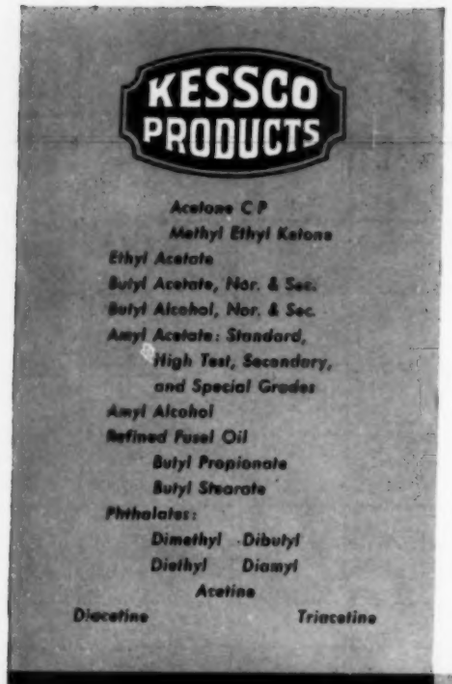
S = Solvent
SS = Solvent Softener
NSS = Nonsolvent Softener
P = Plasticizer
S = Solidifies or Melts
F = Flash Point
B = Boiling Point
D = Diluent
L = Latent Heat of Fusion
S = Specific Heat
V = Latent Heat of Vaporization

Names	Formulas Emperical Structural	Mol Wt	Sp. Gr.	D = Diluent	B = Boiling Point	Vapour Pressure	Critical T. Temp. P. Pressure	Viscosity Centipoises	V = Latent Heat of Vaporization	Capillary Constant	Refractive Index	Surface Tension
Ethylidene Ether	$C_6H_{12}O_2$ $CH_3CH(OC_2H_5)_2$	90	0.8590 $^{20}_{20}$	S	B 63/751							
d) Fenchone	$C_{10}H_{16}O$ $CH_2{:}C{-}CH_2\,CH_2{-}CH_2{-}CH{-}C(CH_3)_2{-}CO$	152	0.944	SS	M 6. B 195.						1.44647	
l) Fenchone	$C_{10}H_{16}O$ $CH_2{:}C{-}CH_2\,CH_2{-}CH_2{-}CH{-}C(CH_3)_2{-}CO$	152	0.948	SS	S 8.5 B 193						1.4635	
Fenchyl Alcohol	$C_{10}H_{18}O$ $CH_2{:}C{-}CH_2{-}CH_2{-}CH{-}C(CH_3)_2{-}CHOH$	154		P	S 49 B 209							
dl Fenchyl Alcohol	$C_{10}H_{18}O$	154	0.933 $^{20}_{20}$	P	S 47 B 201							
Fenchyl Alcohol (Inactive)	$C_{10}H_{18}O$	154	0.953	NSS	S 33 B 204.6							
l-d Fenchyl Alcohol	$C_{10}H_{18}O$	154	0.935 $^{20}_{20}$	NSS	S 42 B 201.							
d-iso-Fenchyl Alcohol	$C_{10}H_{18}O$ $CH_2{:}C{-}CH_2\,CH_2{-}C(CH_3)_2{-}CH{-}CH_2{-}CHOH$	154		P	S 62-63 B 202-4							
iso Fenchyl Alcohol (inactive)	$C_{10}H_{18}O$ $CH_2{:}CH{-}CH_2\,CH_2{-}C(CH_3)_2{-}CH{-}CH_2{-}CHOH$	154		NSS	B 204							
l iso Fenchyl Alcohol	$C_{10}H_{18}O$	154	0.961 $^{20}_{15}$	P	S 62 B 202						1.4801 $^{20}_{15}$	
Formaldehyde	CH_2O	30	0.815 $^{-20°}$	D	S -92. B -21.							
Formanilide	C_7H_7ON C_6H_5NHCHO	121	1.112 $^{60°}$	P	S 47.5 B 271.			8.70/55				39.4/60
Formic Acid	CH_2O_2 $HCOOH$	46	1.2201 / 1.2188	D 85%	S 8.3 B 100.5	38/20		1.635/24.6	L 58.8 S 417/20-100 V 120.37		1.37137	37.6/20
Formyl acetyl-o-toluidine	$C_{10}H_{11}O_2N$ $C_6H_4CH_3N(CHO)COCH_3$	177		P								
Formyldiphenylamine	$C_{13}H_{11}ON$ $(C_6H_5)_2NCHO$	197		P	S 72 B 190/13							
Furacrylic Acid	$C_7H_6O_3$ $C_4H_3OCH{=}CHCOOH$	138		D	S 137							
Furfural	$C_5H_4O_2$ C_4H_3OCHO	96	1.1598	S	S -38.7 F 55.7 B 161.7	8/40			S 416/20-40 V 107.5		1.52608	43.5/20
Furfuryl Acetate			1.1175	S	B 176.						1.4627	
Furfuryl Alcohol	$C_5H_6O_2$ $C_4H_3O{-}CH_2OH$	98	1.135	S	B 170.2						1.4852 $^{20.1°}$	
Tetrahydro Furfuryl Alcohol	$C_5H_{10}O_2$ $C_4H_7O{-}CH_2OH$	102	1.0514	D	B 177-8						1.4508	
Furfuramide	$C_{15}H_{12}O_3N_2$ $(C_4H_3OCH)_3N_2$	268		P	S 121. B 250d							
Furoic Acid	$C_5H_4O_3$ C_4H_3OCOOH	112		LS	S 133 B 231							
Glycerol	$C_3H_8O_3$ $CH_2OH{\cdot}CHOH{\cdot}CH_2OH$	92	1.260	D	S 17.9 B 290.	0/3781		8.3/20.3	L 47.3 S .646 V 158		1.4729	
Glycerol-mono-Benzoate	$C_{10}H_{12}O_4$ $C_6H_5{\cdot}COO{\cdot}CH_2{\cdot}CHOH{\cdot}CH_2OH$	196		NSS	S 36 B 124/2							
Glycerol-tri-Benzoate tribenzoin	$C_{24}H_{20}O_6$ $(C_6H_5COO)_3C_3H_5$	404	1.25	P	S 76.5 B decomp							



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The Plastic Products Industry has created a demand for plasticizers, softeners and solvents with properties meeting special requirements. In addition to our regular plasticizers such as the

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we are producing special products to meet these needs. Our technical and manufacturing experience may solve your problem: we offer our cooperation.

K 403

The Kessler Chemical Corporation has always confined its manufacture to solvents and plasticizers and is not offering lacquer or intermediate products.

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Subsidiary of the

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SHEETS and RODS

- *Non-inflammable*
- *Made in beautifully mottled and plain colors*

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50 Union Square New York

S = Solvent; SS = Solvent Softener; NSS = Nonsolvent Softener; P = Plasticizer; S = Solidifies or Melts; F = Flash Point; L = Latent Heat of Fusion; S = Specific Heat

Names	Formulae Emperical Structural	Mol Wt	Sp Gr	D = Diluent	B = Boiling Point	Vapour Pressure	Critical T = Temp. P = Pressure	Viscosity Centipoises	V = Latent Heat of Vaporization	Capillary Constant	Refractive Index	Surface Tension
Glyceryl-tri-Formate	$C_6H_8O_6$ $(HCOO)_3C_3H_5$	176	1.320	SS	S 18 B 266						1.44404	396/91 496/0
mono Glyceryl Salicylate	$C_{10}H_{12}O_5$ $HOC_6H_4COOCH_2CH(OH)CH_2OH$	212	1.366	P	S 76							
Glyceryl-tri-Salicyl ate	$C_{24}H_{20}O_9$ $[HOC_6H_4(COO)]_3CH_2CHCH$	452		P	S 79							
n-Heptyl Acetate	$C_9H_{18}O_2$ $CH_3COOC_7H_{15}$	158	0.874 18/4	S	B 191.5						1.4153	
Hexyl Acetate	$C_8H_{16}O_2$ $CH_3COO(CH_2)_5CH_3$	144	0.8902 0/0	S	B 169.2							
d.l. Hexyl Acetate (secondary)	$C_8H_{16}O_2$ $CH_3COO\cdot CH\cdot CH_3$ $(CH_2)_2CH_3$	144	0.864	S	B 57/20						1.4030	
Mesityl Oxide	$C_6H_{10}O$ $(CH_3)_2C{:}CH\cdot CO\cdot CH_3$	98	0.857 B 0.8578		S -50 B 123.39 C			0.879/28	S .521/21-121 V 85.7/128		1.44588 16° 1.44387	28.3/24
Mesitylene	C_9H_{12} $C_6H_3(CH_3)_3$	120	0.8646 15/4 0.863	D	S -52.7 F B 164.6	27.15/200			S .392/0 V 74.4/165		1.4967 1.49844 17.1	28.51/20
Methyl Abietate	$C_{21}H_{32}O_2$ $C_{19}H_{29}COOCH_3$	316	1.050 24 15/4	NSS	B 225/16 20						1.5344 22	
Methyl Acetal	$C_4H_{10}O_2$ $CH_3CH(OCH_3)_2$	90	0.8580 14	S	B 62.7/751							17.13/63.3
Methyl Acetate	$C_3H_6O_2$ CH_3COOCH_3	74	0.935 18/4 0.92438	S	S -98.05 F -13 B 57.1	23.5/25 16 1698/20	T 233.7 P 463	0.3706/20.7	S 468/15 V 98.26		1.361 8 1.35935	24.58
Methyl Acetonilid	$C_9H_{11}ON$ $C_6H_5N(CH_3)COCH_3$	149		P	S 102. B 254.7			0.82/120				32.4/105
Methyl Acetoacetate	$C_5H_8O_3$ $CH_3COCH_2COOCH_3$	116	1.077 1.0756 30.5	S	B 170			1.702/20			1.4196 1.41837 30.5	28.1/70 46.5/-70
Methyl Adipate	$C_8H_{14}O_4$ $(CH_2)_4(COOCH_3)_2$	174		SS	S 8 B 112/10							
Methylal	$C_3H_8O_2$ $CH_2(OCH_3)_2$	76	0.862 0.8604	D	S -104.8 B 44.		T 224		S .521/15-41 V 90.9/		1.35344	
Methyl Alcohol	CH_4O CH_3OH	32	0.792 0.7980 14.5	LS	S -97.8 F 11 4 B 64.5	95/20 4	T 240 5 P 78.70 5	0.546/25	L 16.4 S .645 5 V 262.2 3		1.329 1.33118 14.5	23.9/20 8 22.61/20
n-Methyl Amyl Ketone	$C_7H_{14}O$ $CH_3(CH_2)_4COCH_3$	114	0.822 15	S	B 150			0.766/25				
o-Methyl Benzaldehyde	C_8H_8O $C_6H_4CH_3CHO$	120	1.039	D	B 195.5						1.5485 19	
m-Methyl Benzaldehyde	C_8H_8O	120	1.019	D	B 195.5						1.5671 17	
p-Methyl Benzaldehyde	C_8H_8O	120	1.020	D	B 204						1.5503 11.9	
Methyl Benzoate	$C_8H_8O_2$ $C_6H_5COOCH_3$	136	1.0942 15/15 1.0905 16.	S	S -12.3 B 199.6	3.9/60		2.067/20	S .362/0		1.5165 1.51810 16	37.6/20
n-Methyl Butyl Ketone	$C_6H_{12}O$ $CH_3CO(CH_2)_3CH_3$	100	0.830	S	S -56.9 B 127.2			0.584/25	S .528/21-127 V 82.5/127			25.49/20
iso-Methyl Butyl Ketone	$C_6H_{12}O$	100	0.8036 17.4	S	S -84.7 B 119.			0.5799/20	S .459/20		1.3959 1.39694 17.4	
sec-Methyl Butyl Ketone	$C_6H_{12}O$	100	0.815	S	B 117.8						1.399	

NATIONAL

RESIN COLORS

BRILLIANT
UNIFORM

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A COMPLETE LINE OF COLORS SPECIALLY MANUFACTURED FOR BOTH MOULDED AND CAST PLASTIC COMPOUNDS

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PLASTICIZERS, SOLVENTS & RAW MATERIALS

for the manufacture of

PLASTICS

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DIBUTYL PHTHALATE
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CRESYLIC ACID
SODIUM ACETATE
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AMERICAN-BRITISH CHEMICAL SUPPLIES, Inc.
180 Madison Avenue New York, N. Y.
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(Manufacturers of Organic Chemicals)
New York City and West Haverstraw, N. Y.

CHAS. TENNANT & CO. (Canada) LIMITED
372 Bay Street Toronto 2, Canada

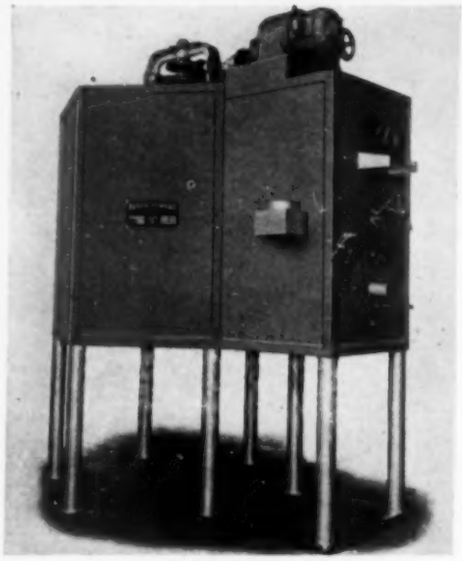
S = Solvent; SS = Solvent Softener; NSS = Nonsolvent Softener; P = Plasticizer; D = Diluent

S = Solidifies or Melts; F = Flash Point; B = Boiling Point

L = Latent Heat of Fusion; S = Specific Heat; V = Latent Heat of Vaporization

Names	Formulas Empirical Structural	Mol Wt	Sp Gr.	D.	B. P.	Vapour Pressure	Critical T. Temp. P. Pressure	Viscosity Centipoises	Latent Heat of Vaporization	Capillary Constant	Refractive Index	Surface Tension
Methyl-n-Butyrate	$C_5H_{10}O_2$ $CH_3(CH_2)_2CO_2CH_3$	102	0.8982	S	S <-95. F 14 B 102.3	63.9/20 24.6/20	T 281.3 P 34.2	5.45/25	S .458/20 V 79.75		1.3879	25/20
Methyl-iso-Butyrate	$C_5H_{10}O_2$ $(CH_3)_2CHCOOCH_3$	102	0.8906	S	S -84.7 B 92.6	55/20 39/20	T 262.5 P 33.7	5.170/20	S .7907 V 784/91.1		1.3840	23.72 23.8/20
Methyl Carbamate	$C_2H_5O_2N$ NH_2COOCH_3	75		P	S 52 B 177.			2.28/55.6				
Methyl Carbanilate	$C_8H_9O_2N$ $C_6H_5NHCOOCH_3$	151	1.251 19	P	S 47							
Methyl Carbonate	$C_3H_6O_3$ $CO(OCH_3)_2$	90	1.069 22	S	S 0.5 B 89.7				S .458/20-88 V 88.5/90		1.369	
Methyl Chloracetate	$C_3H_5O_2Cl$ $CH_2Cl\cdot CO_2CH_3$	108	1.2378 20/20	S	S -32.7 B 131.5				S .382/20			
Methyl Cinnamate	$C_{10}H_{10}O_2$ $C_6H_5CH{:}CHCOOCH_3$	162	1.042 36/0 1.0681 21.4	NSS	S 36. B 259				L 26.5		1.57661 21.4°	39.5/20
di Methyl cyclobutanone	$C_6H_{10}O$ $CH_2CH_2CO\,C(CH_3)_2$	98		S								
o-mono Methyl-cyclohexanol	$C_7H_{14}O$ $CH_2{:}CH_2{:}CHOH(CH_2)_2$ $CH\cdot CH_3$	114	0.927 0.9251 24.5	LS	B 165						1.4587 24.6	
m-mono-Methyl-cyclohexanol	$C_7H_{14}O$ $CH_2CH\cdot OH(CH_2)_2$ $CH\cdot CH_3$	114	0.918 0.9333 13.4	LS	F 68.4 B 172.5						1.46585 13.4	
p-mono Methyl-cyclohexanol	$C_7H_{14}O$ $HO\,CH(CH_2)_4CH$ CH_3	114	0.917 0.9152 24.4	LS	B 173.						1.45734 24.4	
di Methyl-cyclohexanol (commercial)	$C_8H_{16}O$ $C_6H_9(CH_3)_2OH$	128		S								
mono Methyl-cyclohexanol-acetate	$C_9H_{16}O_2$ $CH_3COOC_6H_{10}CH_3$	156	0.990 14/0	S	F 65 B 202.							
Di Methyl-cyclohexanol acetate (commercial)	$C_{10}H_{18}O_2$ $CH_3COOC_6H_9(CH_3)_2$	171		S								
Di Methyl-cyclohexanol adipate "Sipalin AON"	$C_{20}H_{34}O_4$ $(CH_2)_4(COOC_6H_{10}CH_3)_2$	338	1.011	SS	F 189. B 226-32/12							
Methyl-cyclohexanol-β-methyl adipate "Sipalin MON"	$C_{21}H_{36}O_4$ $CH_3CH(CH_2)_2(COO$ $C_6H_{10}CH_3)_2$	362	1.009	SS	F 195 B 216-24/12							
Methyl-cyclohexanol formate	$C_8H_{14}O_2$ $HCOOC_6H_{10}CH_3$	142	0.957	S	F 64 B 173-80							
Methyl-cyclohexanol oxalate	$C_{16}H_{26}O_4$ $(COOC_6H_{10}CH_3)_2$	282	1.035	SS								
mono Methyl cyclohexanone (commercial)	$C_7H_{10}O$ $CH_3C_6H_7O$	112	0.9266	S	F 48 B 165-71						1.44	
di Methyl-cyclohexanone (commercial)	$C_8H_{14}O$ $C_6H_8(CH_3)_2O$	126		S								
Methyl cyclpentanol Acetate	$C_8H_{12}O_2$ $CH_3COOC_5H_6CH_3$	140		S	B 56-8/14							
Methyl Ether	C_2H_6O $CH_3\,O\,CH_3$	46	1.617	LS	S -138. F -41 B -24.9		T 126.9 P 52					
Methyl-Ethyl-Ketone	C_4H_8O $CH_3COC_2H_5$	72	0.805 0.8087 15.9	S	S -86.4 F <0 B 79.6	77.5/20		0.497/25	S .549/20-78 V 103		1.739 1.38071 15.9	
Methyl Formate	$C_2H_4O_2$ $HCOOCH_3$	60	0.975	S	S -99.8 F -99.7 B 31.9	476/20	T 214 P 58.1	0.3298/25.5	S .515/13-29 V 110.45		1.344	25.00/20

—To be continued in August



The B-P Diathermatic Kettle, showing heater head, controls and fan motor.

HIGH-TEMPERATURE COOKING PROCESSES

as employed in:

The Manufacture of Synthetic Resins
(including phenolic and glyptal);
Bodying Linseed Oil
Cooking Oils and Varnish Gums
Manufacture of Protective Coatings

BAKER PERKINS DIATHERMATIC COOKERS are *set kettles*, employing positive heat control with unprecedented flexibility.

You are assured a kettle particularly adapted to modern methods and processes, with a heating system that definitely guarantees uniform heat application through improved methods of heat transfer.

Oil or Gas Firing
Agitators to suit any requirement

Consider these features:
Open or Closed Type
For Vacuum or Pressure Cooking

Insist on accurate, automatic control of heat application in your cooking processes. *Specify Baker Perkins Diathermatic.*

BAKER PERKINS COMPANY INC.

(WERNER & PFLEIDERER DIVISION)

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for the Molding Specialist

Buttons, Buckles, Closures, Trays, Instrument Cases. Pastel and Seasonal Shades in MAKALOT and RICHWARE

RADIO AND ELECTRICAL	EM 1040 Low Loss Molding Compound for Short Wave Radio Parts. EM 1010 Arc Resisting Material for Distributors of Quality. No. 1175 Black MAKALOT for Arc Boxes, Switches and Relay covers.
SHOCK RESISTING	No. 66-E in Black, Brown and other colors combining great strength and beautiful finish, having the usual excellent flowing qualities of all MAKALOT materials.
HIGH HEAT	No. 75-D Black and Brown all Mineral Filler. No. 75-H Black and Brown Suitable competitive Heater Plugs. You will not have to struggle, kick or cuss if you use either of these materials because they positively will not stick, stain or poison your molds.
Rayon and Textile Spinning Parts	Try our Long Flow Black for these Intricate Parts.
EXTRUSION	Black, Brown, Natural. No. 170-A-4 was used to make the most difficult Extrusion Piece, and No. 83-R was the material used in molding the largest Radio Cabinet ever molded in America.
RICHWARE	Tasteless, Odorless, in beautiful pastel shades and brilliant colors. Can be sterilized without cracking or distortion. Suitable for toilet articles, plates, cups, saucers and all table and kitchen ware. Has double the strength of the standard Phenolics.

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Factory: Waltham, Mass.

Manufacturers of Molding and Paper Impregnating Resins, Lacquers, Varnishes and Cements.

Plastics and Coating News

Synthetic Plastics Opens New Show-room—Celluloid Announces "Ivaleur"—a New Cast Material—Code Authority Announced for The Synthetic Leather Industry—Status of The Fabricators' Code Unchanged—Marblette Opens Chicago Office—Waterbury Button Has a N. Y. Show-room.

On the 57th floor in Radio City Synthetic Plastics has set up in its new offices an attractive new show-room for molded objects made of Beetle molding powder. There are 20 illuminated windows and tables in which the work of various American and foreign molders is shown on illuminated ground glass shelves, thereby playing up the gay translucency of the objects. Several hundred moldings are exhibited, and it is intended to make this a permanent museum which will be added to from month to month, and kept under lock and key, so as to constitute a complete and perfect collection. One window is devoted to the new Beetle pastel colors, a series of 6 scientifically contrasted pale tones on a pearly white base. Another exhibits the achievements of the Company in the premium field, some 40 million pieces in the aggregate having been distributed with various foods and other merchandise as the result of the Company's activities in digging up premium business for the molders.

The variety of the exhibition is greatly increased through the inclusion of one example of practically every urea plastic object that has been molded in England, Germany and France. The material is sold under the name of "Pollopas" in Germany and France, and under the names "Pollopas" and "Beatl" in England; all the producers, including the American Beetle, being subject to the master patents licensed by Pollopas Limited of London. The German exhibit is the largest, showing a great diversity of shapes, mostly in tableware, and including larger pieces than are characteristic of the American display.

It was originally intended to devote one window or table to each Beetle molder, but the attractiveness of the exhibits that came in from abroad has, for the time being at least, compelled mingling the work of the American molders, and classifying the exhibits on other bases.

Walls are made of laminated Beetle Micarta in green, tan, and black, with aluminum fittings. Floor is of Zenitherm, supplied by another subsidiary of Cyanamid, and even the plaster of the ceiling and the Gypsum slabs which constitute the walls are products of Cyanamid, the parent company.

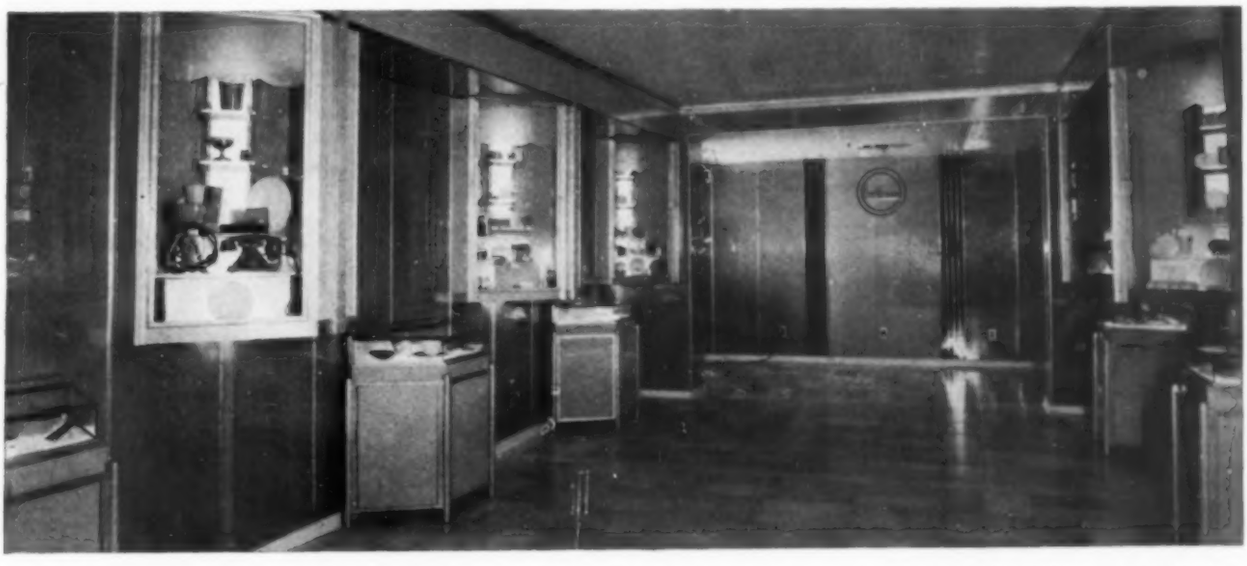
There has been no formal opening of the exhibit, but Synthetic Plastics would like to have it known that the exhibit is ready, the new offices are in order, the air-conditioning system is working, the views from the windows are worth the trip, and to all who are interested in the molding art the welcome will be warm. It is hoped by Synthetic Plastics' officials that molders will scrutinize the exhibit, to be sure that their own products are adequately represented, and a continuous supply of new moldings for the exhibit is desired.

What Better Business Does

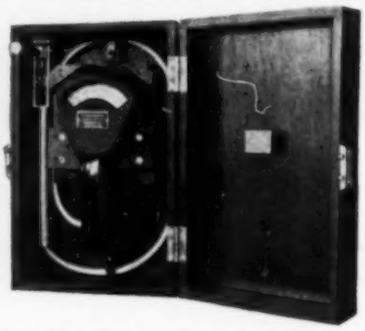
Consolidated Products has made alterations and extensions to its suite on the 20th floor of 13-14 Park Row, N. Y. City, adding a number of new private offices and enlarging executive and clerical space. Officers report a more widespread demand for used plastics machinery, and this expansion of office space has been arranged to take care of increased volume of business.

A Specialty Fair

Advertising Specialty National Association will hold a Specialty Fair in connection with the annual meeting at the Stevens in Chicago, Sept. 24-26. Those interested in exhibiting should write the Association offices, 111 W. Washington st., Chicago.



Synthetic Plastics' new salon on the 57th floor of Radio City's RCA Bldg. is a fitting tribute to the artistic and utilitarian qualities of Beetleware and has already become an extremely popular meeting place for designers, molders and clients.



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The Color Guarantee limits molding temperature to within 10 degrees . . . product use demands freedom from under-cure warpage . . . therefore accurate molding temperatures are imperative. Steam pressure gauge indications are not true indications of mold temperatures. The Cambridge Mold Pyrometer does give mold temperatures quickly and accurately. Use it and reduce rejects.

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Mold and Surface
PYROMETERS

Send for details of these instruments. They will help save money and make better plastics.

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THE MOST WIDELY-USED FILLER FOR PLASTICS. MADE BY A NEW PROCESS, EXCLUSIVE WITH BECKER-MOORE, THE LARGEST DOMESTIC SUPPLIERS.

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Uniform Screen Analysis

BECKER-MOORE & CO., INC.

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Steel Steam Platens **Die Presses and Dies**

This mixer constructed with many new important features desired for efficient mixing operations

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Complete specifications on request

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Cavagnaro-Loomis Vacuum Mixer
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Codes Status

Status of the Laminated Phenolic Products Industry Code remains unchanged in the past 30 days. Code has been approved by the NEMA board of governors and is ready for presentation to the NRA. Likewise no change has been made in the status of the fabricators' code which is still in NRA hands.

Cast

Celluloid's "Ivaleur"

The Celluloid Corporation is now producing cast phenolic under the trade name "Ivaleur." Three production units have already been installed at the Newark plant and further additional plant facilities will be added. Deliveries in quantities have been made and fabricators report that the material possesses remarkably fine working properties, in addition to its attractiveness.

Marblette in Chicago

Marblette has opened a new midwestern office at 2719 Sunnyside ave., Chicago, in charge of R. C. Milner, formerly Celluloid Chicago representative.

Synthetic Leather Code

Following have been approved by NRA as members of the code authority for leather cloth and lacquered industry:—Rudolf Neuberger, of Zapon, Stamford, Conn.; W. E. Masland, Masland Duraleather, Philadelphia; and George T. Bristol, of Permatex Fabrics, Jewett City, Conn. Following have been approved as the industry's control committee:—J. K. Weidig, Keratol, Newark, N. J.; G. M. Jackson, Western Shade Cloth, Chicago; E. A. Clare, of Athol Manufacturing, Athol, Mass.; J. W. F. Young, Federal Leather, Belleville, N. J.; J. W. Hanson, jr., Zapon, Stamford, Conn.; W. H. Jenks, of L. C. Chase & Co., N. Y. City, and L. E. Carpenter, of L. E. Carpenter & Co., Newark, N. J.

Coatings

Flashes From North Tonawanda

General Plastics will erect a 2-story plant addition. New distributers of company's paint resins include: A. W. Paterson, 526 Roselawn ave., Toronto; Downer Hunnewell & Co., 148 State st., Boston; W. R. Grace & Co., N. Y. City; George F. Smith, Fulton Bldg., Pittsburgh; and A. L. Webb & Sons, 514 S. Eutaw st., Baltimore.

Duco at Atlantic City

Use of Brush Duco in the home, as well as for refinishing automobiles, was recently demonstrated in one of the Boardwalk windows of the Du Pont Exhibit at Atlantic City. New Duco White, described as "the whitest white you ever saw," was stressed in the display. Acting as a background for the demonstration was a reproduction of a Colonial fireplace, mantel of which was finished in new Duco White.

Company Booklets

No. 18. Consolidated Products Co., 15 Park Row, N. Y. City. June issue of Consolidated News contains many interesting news items on equipment. Plant managers who are buyers of any sort of equipment should receive this monthly publication regularly for which there is no charge.

No. 79. Dielectric Products Corp., 63 Park Row, N. Y. City. New booklet completely describes Victron—a versatile resin reported to possess remarkable radio frequency properties—adapted to pressure molding and to the manufacture of laminated insulation—for use in the production of lacquers, varnishes, insulating compounds and cements.

No. 80. General Electric Co., Plastics Dept., Pittsfield, Mass. Booklet GEA-1658A gives specifications and complete technical data on Textolite roll-neck bearings.

No. 81. General Plastics, North Tonawanda, N. Y. A brand new booklet covers the main uses of molded plastics in packaging—caps, boxes, displays, jars, etc. To the packer of materials who is eager to know more about the use of plastics the book brings a wealth of valuable information.

No. 82. Hercules Powder Co., Wilmington, Del. Company has released pages 75 to 83 of the nitrocellulose handbook. This addition contains new material entitled "Relation of Viscosity Type Nitrocellulose to Usable Concentrations." Information aids in a better understanding of the relationships between nitrocelluloses of different viscosities, particularly in reference to the concentrations that can be used for various purposes. It will assist also in solving some of the detailed problems involved in selecting nitrocellulose for particular purposes. Three charts (2 separate) are included with these pages. The large charts have been reproduced on heavy cardboard suitable for hanging on the wall. They will be furnished ready for hanging for those who desire them.

No. 83. John C. Hoof Co., 162 N. Franklin St., Chicago. A splendidly illustrated booklet providing the story of Textolite timing gears for automobiles.

No. 84. The Synthane Corp., Oaks, Pa., manufacturer of Synthane laminated Bakelite, has issued an interesting new laminated Bakelite sample book. In handy pocket size and profusely illustrated, it gives excellent reproductions of sheets, rods, tubes, fabricated parts and possible machine operations. A distinctive feature is the presentation of actual samples of the material. Samples of Synthane have been slipped into paper envelopes on the right hand pages from which they can be easily removed for inspection. On the opposite, left hand pages, the properties, characteristics, colors, sizes, grades and thicknesses are condensed to short paragraphs that can be read in a few moments. Standards of quality and test values are in the back.

No. 85. Taylor & Co., Norristown, Pa. A most strikingly effective use of out-of-the-ordinary photographs illustrating the manufacture and application of both vulcanized and phenol fibre makes the release of this brochure a real event. Need it be said that present users and prospective users should have a copy at hand?

APRIL PAINT, VARNISH AND LACQUER SALES

Statistics on sales of paint, varnish, and lacquer products, based on data reported to the Bureau of the Census by 586 identical establishments, are presented in the table below, which shows, by months, the total volume of sales reported, the volume reported by 242 establishments which are unable to classify their sales into trade and industrial, and the volume reported by 344 establishments which have classified their sales into trade and industrial (paint and varnish, and lacquer).

Year and Month	Total sales reported by 586 establishments	Classified Sales Reported by 344 Establishments				Unclassified sales reported by 242 establishments
		Industrial Sales			Trade sales of paint varnish and lacquer	
		Total	Paint and Varnish	Lacquer		
1934						
January	$20,643,659	$6,015,030	$4,290,923	$1,724,107	$7,470,517	$7,158,112
February	17,715,447	5,639,413	3,714,128	1,925,285	6,256,162	5,819,872
March	23,193,396	7,105,176	4,768,864	2,336,312	8,504,997	7,583,223
April	27,768,932	7,589,828	5,256,548	2,333,280	10,845,963	9,333,141
1933						
January	$11,275,396	$3,529,886	$2,386,947	$1,142,939	$4,168,260	$3,577,250
February	11,665,734	3,423,033	2,445,378	977,655	4,771,706	3,470,995
March	13,578,568	3,391,947	2,484,550	907,397	5,788,213	4,398,408
April	19,043,787	4,677,309	3,143,803	1,533,506	8,582,411	5,784,067
May	26,241,044	5,991,938	4,298,455	1,693,483	11,788,573	8,460,533
June	27,813,233	6,827,509	4,832,551	1,994,958	12,443,998	8,541,726
July	22,090,187	6,406,184	4,493,516	1,912,668	8,627,400	7,056,603
August	20,620,811	6,323,475	4,754,701	1,568,774	7,840,359	6,456,977
September	19,097,803	5,544,686	3,975,917	1,568,769	7,462,113	6,091,004
October	18,944,106	4,949,755	3,721,420	1,228,335	7,376,012	6,618,339
November	16,234,234	4,656,353	3,466,174	1,190,179	6,566,157	5,011,724
December	16,156,062	4,418,023	3,428,376	989,647	6,157,567	5,580,472
Total (Year)	$222,760,965	$60,140,098	$43,431,788	$16,708,310	$91,572,769	$71,048,098
1932						
January	$15,894,506					
February	16,270,822					
March	19,089,005	(a)	(a)	(a)	(a)	(a)
April	22,612,193					
May	24,981,441					
June	19,637,358	$4,685,399	$3,617,719	$1,067,680	$8,734,330	$6,217,629
July	14,430,122	3,793,245	2,900,707	892,538	6,058,813	4,578,064
August	16,032,441	3,851,028	3,057,096	793,932	6,918,659	5,262,754
September	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
October	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
November	12,492,818	3,599,319	2,639,362	959,957	5,196,766	3,696,733
December	9,484,520	3,222,770	2,186,706	1,036,064	3,506,715	2,755,035
Total (Year)	$203,323,315	.....	.....	.....	.....	.....

(a) Comparable statistics not available.

Plastics Products
25 Spruce Street
New York City

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Name .....
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IMPROVEMENTS INCLUDE:

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SAW BLADES
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No. 1 machine has 9" swing between saw and arm.

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We specialize in MACHINES, TOOLS and DIES for working CELLULOID, CATALIN and similar plastic materials.

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▼ Problems

If you are planning the use or purchase of molded plastic materials, my eight years' practical experience is at your disposal and my unaffiliated, expert service at your command.

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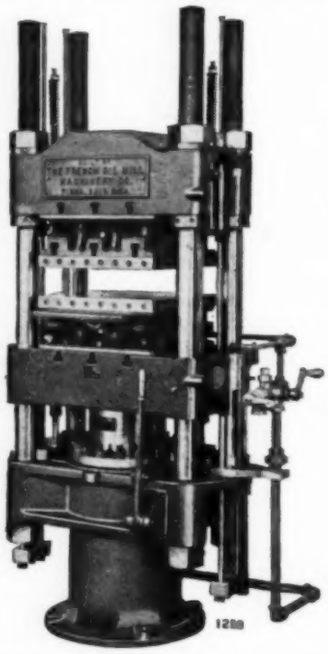

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Molding Presses for all compounds of all sizes and types

The French Oil Mill Machinery Co.

PIQUA, OHIO

Premium Notes

Howard W. Dunk, secretary, Manufacturers' Merchandise Advertising Association, estimates that the use of premiums has increased by 50% during the past 4 years.

Suppliers of premiums report sharp improvement in demand from foodstuffs, soap, and tobacco companies.

Laminated

NEMA calls attention to "Laminated Phenolic Standards" (Pub. No. 31-13), priced at 25c for non-members.

Molded

A Novel Application

One of the most interesting and unusual new applications for molded plastics can be found in many of the '34 cars—molded bumper shoes in the door dovetail assemblies. This development grew out of the search by automotive body engineers for a door bumper casing assembly that would be free from squeaks and rattles for the life of the car, without oiling or greasing. The entire assembly has always been made of metal.

It hardly seemed feasible to use molded plastic material, when even hard inorganic materials like ferrous metals wore themselves down after a few thousand miles in contact with each other, permitting excessive play and resultant rattles and squeaks. But it is a peculiarity of synthetic plastics that when in contact with wearing surfaces of metal, as in gear trains, there is a great reduction of wear on both materials. Preliminary tests duplicating the impact and friction of door bumper shoes against the wedge plates made this peculiarity quite evident.

In developing the first molded shoes, the fabricator, Chicago Molded Products Corp., found that graphite could be incorporated into the molding powder to reduce the coefficient of friction and ease the entry of the wedge. Coil springs were imbedded in the non-blooming rubber cushions to lengthen their life, into which bosses on the molded blocks would fit. A special type of extra-strength Durez molding compound was decided upon, after tests with single cavity molds.

First tests took place in the laboratory hot rooms and cold rooms to determine any effect of heat and cold on the assemblies. This being satisfactory, road tests were started with assemblies built into the various makes of cars. At the end of 25,000 to 30,000 miles of winter and summer driving over all types of roads, squeaks and rattles were still absent and the Durez blocks were found to be in excellent condition.*

Waterbury Opens in N. Y. City

Waterbury Button, Waterbury, Conn., has installed a showroom and a display of molded pieces at 25 W. 43 st., N. Y. City. Visitors are, of course, welcome.

New Cap Liner

Phoenix Metal Cap, Chicago, has a new liner of wide application (made out of Carbide's "Vinylite") and for which it claims many superiorites over wax paper, black paper, varnish paper, and oil papers.

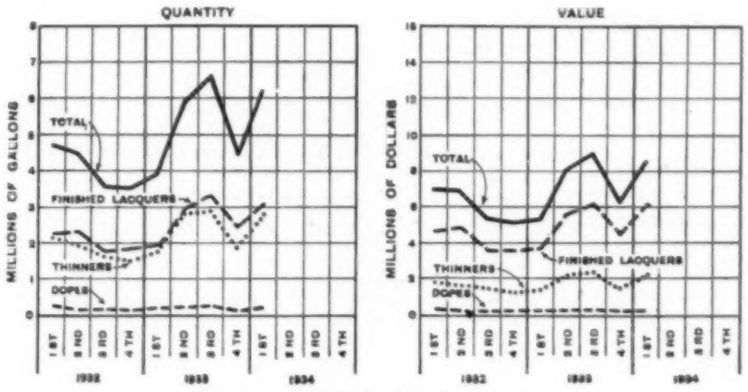
Checking Woolworth's

PLASTIC PRODUCTS' reporter, browsing through Woolworth's William Street, N. Y. City store, was attracted by a large sign "Bakelite Coasters." Picking one up for examination the back was plainly stamped genuine "Hemcoware"—Bettleware (Cyanamid) molded by Bryant Electric.

Cellulose

Cellophane Drapes

Abraham & Straus (leading Brooklyn department store) is giving practical demonstration of the decorative effects possible with colored Cellophane by using it in the store restaurant on the 5th floor. Signs through-



Sales of lacquer in the first quarter

LACQUERS FIRST QUARTERLY REPORT, 1934

Compared with preceding quarters

Quarterly statistics on sales of finished lacquer, lacquer thinners and dopes, based on data reported to the Bureau of the Census by 102 identical manufacturers, are presented in the following table:

SALES OF LACQUER

(Including sales of package goods to jobbers and dealers)

Year and Quarter	Total Sales		Finished Lacquer		Lacquer Thinners		Dopes *	
	Gallons	Dollars	Gallons	Dollars	Gallons	Dollars	Gallons	Dollars
1934								
First Quarter	6,216,891	$8,562,351	3,096,347	$6,051,532	2,831,371	$2,152,620	289,173	$358,199
1933								
First Quarter	3,905,846	$5,323,315	1,916,350	$3,668,615	1,765,148	$1,401,624	224,348	$253,076
Second Quarter	5,935,608	8,044,749	2,938,643	5,561,381	2,708,268	2,152,168	288,697	331,200
Third Quarter	6,568,896	8,890,314	3,340,182	6,176,543	2,932,826	2,340,847	295,888	372,924
Fourth Quarter	4,490,940	6,229,776	2,450,501	4,424,790	1,853,974	1,577,754	186,465	227,232
Total (Year)	20,901,290	$28,488,154	10,645,676	$19,831,329	9,260,216	$7,472,393	995,398	$1,184,432
1932								
First Quarter	4,666,420	$6,947,508	2,249,069	$4,692,055	2,161,317	$1,913,937	256,034	$341,516
Second Quarter	4,475,293	6,867,544	2,337,612	4,823,513	1,968,189	1,796,301	169,492	247,730
Third Quarter	3,578,390	5,382,948	1,778,305	3,593,977	1,601,875	1,515,330	198,210	273,641
Fourth Quarter	3,532,718	5,140,226	1,836,432	3,524,739	1,499,002	1,341,175	197,284	274,312
Total (Year)	16,252,821	$24,338,226	8,201,418	$16,634,284	7,230,383	$6,566,743	821,020	$1,137,199

* Does not include base solutions in the manufacture of lacquers.

* See Roto Section, this issue, for picture.

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HIGHEST BRILLIANCY

GENUINE

RUSSIAN PEARL ESSENCE

Now offered for the first time to the trade from permanent stocks.

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Guaranteed Content of 60 gms. pure guanine crystals per lb. of essence.

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Let us advise you on your specific problems.

For Process Equipment

FABRICATED OF NICKEL

or other special metals, as required

MIXERS—VACUUM PUMPS
VACUUM STILLS—CONDENSERS
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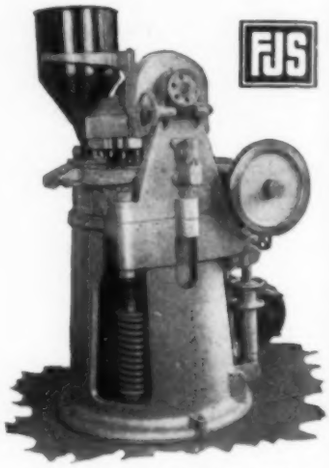
KETTLES

as well as

PREFORMING PRESSES

All nickel, electrically-heated vacuum resin kettle. Complete with direct motor driven agitator. Apparatus capable of maintaining temperature up to 600° F. Nickel condensers and vacuum pump not shown.



(At right) New DDS-2 Rotary Press, one of 15 standard single-punch and rotary models for making preforms of all sizes and shapes. Output 40 to 500 per minute depending on model.

Catalog 31-A covers both types of equipment. Write for copy.

FJS STOKES MACHINE COMPANY

Process Equipment since 1895

5934 Tabor Road — Olney P. O. — Philadelphia, Pa.

Manufacturers of Pyroxylin Sheets and Rods. Molders of Bakelite, Durez, Pyroxylin, Lumarith, Beetle, Plaskon, etc.

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Constantly adding to our processes and equipment, we now offer transfer—or "injection" — molding for intricate parts. We will be glad to help solve your molding and fabricating problems.

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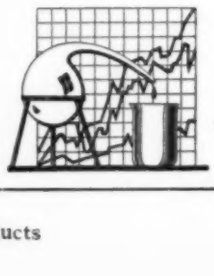

73 NEWBURY ST., BOSTON

out the store call the customers attention to the display.

Personnel Changes

H. Grenville Smith has been made general manager of the cellulose products group (including Cellophane, paint and varnish, Fabrikoid and Pyralin divisions) of Canadian Industries. W. G. Cuttle has been appointed manager of the Cellophane division.

Lamp Shade Covering Tape

Lamp shade covering tape made of Cellophane is being marketed by Arbetter Cello Ribbon, Chicago.

Cellophane Milk Bottle Hoods

Western Dairy Products has adopted a hood made of Cellophane for milk bottle tops. Hood may be applied either by hand or machinery. Packaging Machinery Co. has developed equipment in 2 models for applying hoods at the rate of 45 and 80 bottles per minute. Advantages: sanitary, water-proof, tamperproof, cost less than usual double paper cap, sales value—the use of Cellophane giving an opportunity for new advertising copy.

Direct Label Application?

It is rumored that Du Pont Cellophane Co. will market this fall a machine for direct application of Cellophane labels to bottles, jars, etc.

Safety Glass Markets

All new passenger automobiles and trucks registered in Michigan must be equipped throughout with safety glass, under a law enacted in '31 which will become effective July 1, '34. Michigan, according to a survey made by Pittsburgh Plate Glass, is the 1st state where complete safety glass equipment is required for all new motor vehicles, although in Massachusetts, safety glass has been a requirement since the beginning of this year for the windshields of all new cars, trucks and buses.

Besides Michigan, which was the 1st state to pass such legislation, 7 other states have recognized the importance of safety glass for private passenger cars, and have enacted laws accordingly:

State	Date of Enactment	Location	Date Effective
Mich. ..	1931	All Windows	July 1, '34
Mass. ..	1932	Windshield only	Jan. 1, '34
Neb. ...	1933	All Windows	Jan. 1, '35
N. Y....	1933	All Windows	Jan. 1, '35
Pa.	1933	All Windows	Jan. 1, '35
N. J....	1933	All Windows	July 1, '35
Ia.	1934	All Windows	July 1, '35
Va.	1934	All Windows	Jan. 1, '36

Safety glass is already required in buses and other public vehicles in a number of states, and in still other states laws have been passed which will soon be in operation. The foregoing states are among those which have enacted such legislation and in 5 of them the laws are already in full effect. In addition, several large Metropolitan centers, among them Washington and Minneapolis, have passed city ordinances requiring the use of safety glass.

COMING EVENTS

American Chemical Society, 88th (fall) meeting, Cleveland, Sept. 10-14.

Advertising Specialty National Association, annual meeting and fair, Hotel Stevens, Chicago, Sept. 24-26. Association offices, 111 W. Washington St., Chicago.

Federation of Paint & Varnish Production Clubs, annual convention and joint show, Mayflower Hotel, Washington, D. C., Oct. 28-30. E. F. Maloney, du Pont, Chicago, chairman of the "Paint Show;" V. C. Bidlack, McCloskey Varnish, Philadelphia, chairman of the program committee.

Paint, Varnish and Lacquer Association, annual convention, Mayflower Hotel, Washington, D. C., Oct. 31-Nov. 3. R. W. Elton, secretary, 2201 N. Y. ave., N.W., Washington.

Cellulose Liquor Bands

New cellulose bands so made that they can fit over the top or neck of a bottle after the revenue stamp has been affixed and allow the Government stamp to be easily read through them have just been developed by du Pont. These bands or sleeves are the result of laboratory and research work and tests in the field extending over several months.

They were developed as seals for bottles containing distilled spirits where it is important to protect the package from counterfeiters and also to overcome certain difficulties arising in the shipping and distribution of such packages where the Government seal was likely to be torn or disfigured.

Bureau of Industrial Alcohol has approved the new seals. One of these seals is so made that it is sufficiently transparent to read the Government stamp through it and yet at the same time it appears opaque from a distance and gives a background for the insignia or the trade-mark of the distiller or rectifier.

Second new development is a cellulose sleeve that is opaque both front and back when properly affixed to a bottle of distilled spirits and at the same time the sides of the bands are transparent and the Government strip stamp is entirely in evidence.

Opaque part allows the manufacturer to place on it his insignia, trade-mark or lettering so as to identify his firm. When impregnated with this trade-mark or insignia these bands not only make the package decorative, but insure it against counterfeiting.

These new cellulose bands are developments due to the needs of the manufacturers of distilled spirits, in which manufacture certain problems have arisen.

CELLULOSE PLASTIC PRODUCTS

(Nitro-Cellulose and Cellulose-Acetate Sheets, Rods, and Tubes)

April, 1934

Compared with preceding months

Bureau of the Census presents monthly statistics on production and shipments of cellulose plastic products (sheets, rods, and tubes) for April, '34, based on data furnished by 10 identical manufacturers. Statistics are also shown for 8 identical manufacturers from January to July, and for 10 identical manufacturers from August to December, inclusive, '33. Segregated data for nitro-cellulose and cellulose-acetate products are not available prior to January, '33.

Production and Shipments (Pounds)

Year and Month	Nitro-Cellulose: Sheets Production	Nitro-Cellulose: Sheets Shipments	Nitro-Cellulose: Rods Production	Nitro-Cellulose: Rods Shipments	Nitro-Cellulose: Tubes Production	Nitro-Cellulose: Tubes Shipments	Cellulose-Acetate: Sheets, Rods, and Tubes Production	Cellulose-Acetate: Sheets, Rods, and Tubes Shipments
1934								
January ..	734,085	701,581	138,590	160,081	75,106	67,853	357,836	377,346
February .	916,646	849,552	159,936	133,585	75,315	62,473	435,690	418,027
March* ..	1,194,455	1,012,224	162,202	177,263	78,299	62,270	405,280	350,526
April	1,133,085	871,462	167,787	155,842	82,882	58,171	510,225	558,360
Total (4 mos.)	3,978,271	3,434,819	628,515	626,771	311,602	250,767	1,709,031	1,704,259
1933								
January ..	504,813	625,392	74,872	115,434	12,812	29,329	167,856	160,272
February .	490,290	593,942	78,904	100,092	16,248	25,711	141,628	125,073
March ...	454,506	611,840	63,188	87,784	17,472	32,525	119,400	117,344
April	473,333	624,727	104,817	130,853	26,198	27,091	149,402	211,435
Total (4 mos.)	1,922,942	2,455,901	321,781	434,163	72,730	114,656	578,286	614,124
May	787,614	774,424	161,784	126,195	32,684	36,992	234,811	221,345
June	912,742	959,194	156,830	139,772	41,467	45,057	242,013	220,686
July	1,027,812	916,612	158,250	160,851	42,100	41,467	192,381	221,751
August ..	1,290,521	1,257,981	254,249	236,730	40,364	56,142	230,013	231,879
September.	1,307,052	1,158,080	241,558	232,725	49,263	58,962	213,996	229,629
October...	1,056,328	991,557	254,375	216,191	76,291	69,258	207,327	217,892
November.	641,059	827,544	189,668	134,750	78,712	63,967	257,872	278,774
December..	562,152	944,821	163,317	183,471	72,428	92,673	325,412	352,362
Total (Year)	9,508,222	10,286,114	1,901,812	1,864,848	506,039	579,174	2,482,111	2,588,442

* Revised.

TO BE SURE that their new Electric Clipper would be lighter, stronger, more attractive in appearance, and so have greater sales appeal, John Oster Mfg. Co. specified "all parts to be molded of Bakelite by the Chicago Molded Products Corp."

If your product needs redesign to make it more salable and to lower manufacturing costs,—use these same specifications. *Our Engineering and Design Departments will cooperate with you upon request.*

Chicago Molded Products Corp.
2146 WALNUT ST. CHICAGO, ILL.

PREMIUMS • in plastics

If you have an item suitable for use as a premium, we have the salesmen and the contacts successfully and profitably to market it for you.

• 101 Park Ave., New York

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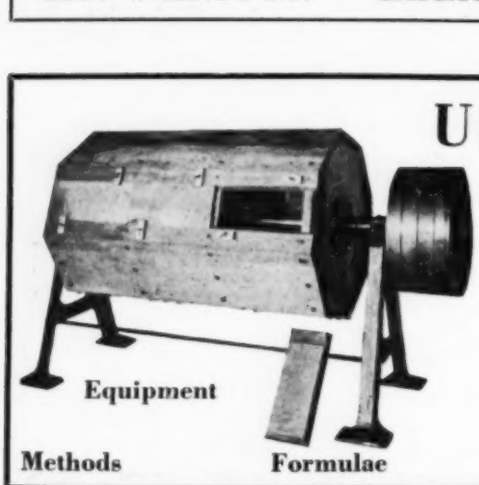

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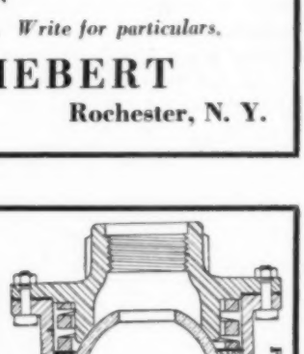

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Plastic Patents

Cellulose

Trade mark, "Cellufoam." No. 344,701. Cellufoam Corp., Chicago. For distended cellulose material for use in the arts.

Mixed cellulose esters. No. 1,957,856. C. J. Staud & C. D. Webber, to Eastman Kodak Co., Rochester, N. Y.

Composition of cell. acetate, ethylene chloride and an amino plasticizer. No. 1,957,857. C. J. Staud & L. M. Minsk, to Eastman Kodak Co., Rochester, N. Y.

Acetate composition containing mixed isometric cresyl toluene sulfonates. No. 1,957,861. E. R. Taylor, to Eastman Kodak Co., Rochester, N. Y.

Acetone-soluble composition, with dioxan & alcohol. No. 1,957,868. C. S. Webber & C. J. Staud, to Eastman Kodak Co., Rochester, N. Y.

Organic ester of cellulose with dibenzyl ether of diethylene glycol. No. 1,957,878. S. J. Carroll, to Eastman Kodak Co., Rochester, N. Y.

For tinting, dyeing or backing film. No. 1,957,888. K. C. D. Hickman, to Eastman Kodak Co., Rochester, N. Y.

Imporous, non-fibrous cell. material for wrappers. No. 1,957,903. W. W. Odell, Chicago, to A. B. Odell, N. Y.

Wrapping sheet with unusual moisture resistance, using orthocresyl paratoluene sulfonate. No. 1,957,912. P. C. Seel, to Eastman Kodak Co., Rochester, N. Y.

Cellulose in solution by thermoplastic action on materials. No. 1,958,376. N. C. Ward, to Anderson-Tully Co., Memphis, Tenn.

Dispersed lignin in lignin-sulfonic acid form. No. 1,958,624. G. C. Howard & C. Harmon, Wausau, Wisc.

Impregnated sheet of mercerized cellulose pulp. No. 1,958,976. Geo. A. Richter, to Brown Co., Berlin, N. H.

Nitrocellulose cement for use in securing leather stock. Nos. 1,959,322-4. W. H. Wedger (1) & F. S. Bacon (2), to Boston Blacking & Chem. Co., Boston, Mass.

Purification of organic esters of cellulose. No. 1,959,446. J. Scheidegger, to Celanese Corp., Wilmington, Del.

Process for alpha cellulose from any origin. No. 1,959,734. F. C. Palazzo & F. Palazzo, Florence, Italy.

For subsurface liquid disintegration of cellulose. No. 1,959,902. G. H. Carnahan, to Intercont'l Rubber Co., Wilmington, Del.

Mechanically pulverizing unmercerized dry fiber batch. No. 1,959,965. Geo. A. Richter, to Brown Co., Berlin, N. H.

Insoluble dye, regenerated cellulose, artificial casings for sausage. Nos. 1,959,978 & 980. E. O. Freund and W. F. Henderson & L. J. Dixon, resp., to The Visking Corp., Chicago, Ill.

Highly flexible cell. acetate-propionate sheeting. No. 1,960,185. C. J. Malm, to Eastman Kodak Co., Rochester, N. Y.

Converting fiber into a non-hydratable condition. No. 1,960,551. Geo. A. Richter, to Brown Co., Berlin, N. H.

Cellulose aralkyl ether & tricresyl phosphate plastics. No. 1,959,641 Leon Lilienfeld, Vienna, Austria.

Process for fireproofing cell. materials; using sulfate ester of an aliphatic alcohol, sodium stannate & chlorinated rubber. No. 1,961,108. M. Leatherman, Hyattsville, Md., to the Public in the U. S. A.

Coatings

Composition of chlorinated rubber, abietic acid ester & solvent. No. 1,957,786. W. Koch, to Hercules Powder Co., Wilmington, Del.

Heat-bodied air-blown oil for oil varnish, miscible with pyroxylin compositions. No. 1,958,372. A. Schwarcman, to Spencer Kellogg & Sons, Buffalo, N. Y.

Trade mark, No. 313,047. Partly prepared paint or lacquer, using nitrocellulose, natural or synthetic resin, etc. Binney & Smith, N. Y. City.

Synthetic drying oil toxic coating composition. No. 1,958,418. W. S. Calcott & F. B. Downing, to du Pont & Co., Wilmington, Del.

Cellulose nitrate protective overcoating. No. 1,958,683. C. J. Staud, to Eastman Kodak Co., Rochester, N. Y.

Cellulose acetate & acetate-propionate protective coating. No. 1,958,706. N. S. Kocher, to Eastman Kodak Co., Rochester, N. Y.

Protective covering using tricresyl phosphate. No. 1,958,707. N. S. Kocher, to Eastman Kodak Co., Rochester, N. Y.

Pyroxylin lacquer with cell. acetate-ester of phthalic acid overcoating, bonded firmly. No. 1,958,708. N. S. Kocher, to Eastman Kodak Co., Rochester, N. Y.

Cellulose acetate-diphenyl benzene/guanidine transparent top coating, for all ultra-violet wave lengths. No. 1,958,711. T. F. Murray, Jr., to Eastman Kodak Co., Rochester, N. Y.

Protective overcoating, cellulose lacquer base. No. 1,958,714. E. E. Richardson & C. J. Staud, to Eastman Kodak Co., Rochester, N. Y.

Nitroanisol, nitro-benzol, etc., in overcoating on cell. nitrate undercoating. No. 1,958,715. E. E. Richardson, to Eastman Kodak Co., Rochester, N. Y.

Patent No. 1,229,694 held not infringed and bill dismissed. S. Jacobs et al vs. Barrett Varnish Co. et al.

Polyhydric alcohol-polybasic acid resin with base material for floor covering. No. 1,959,363. H. H. Hopkins, to du Pont & Co., Wilmington, Del.

Polymerized acetylene polymer with gums, oils, resins, etc., as coating composition. No. 1,959,408. W. S. Calcott, A. S. Carter & F. B. Downing, to du Pont & Co., Wilmington, Del.

Trade mark canceled, No. 200,720. Pigmented pyroxylin coating lacquer. Reg'd 1925, Beckwith-Chandler Co., Newark, N. J.

Anti-fouling coating compositions, using cholesterin, resins, rubber, lactiferous plant exudates, lanolin and solvent. Nos. 1,960,250-3. John Mano, Flushing, to Hosnoler Corp., N. Y. City.

Dehydration of nitrocellulose, and resultant lacquers. No. 1,961,120. C. A. Hochwalt & P. E. Marling, Dayton, to Sharples Solvents Corp., Philadelphia, Pa.

Resinous product, glycerol mixed ester of tung oil acids, phthalic anhydride & rosin. No. 1,958,614. Carleton Ellis, to Ellis-Foster Co., Montclair, N. J.

Disclaimer in use of oxidized fatty acids. No. 1,845,330. Armstrong Cork Co., Assignee.

Laminated

Safety glass using cellulose ester plastic. No. 1,958,013. Geo. H. Murray, Nixon, N. J.

Trade mark, laminated glass. No. 313,338. Rohm & Haas, Philadelphia, Pa., and Pittsburgh, Pa.

Process for pliable wood-veneer, laminated, using solution of heat-hardening resin. No. 1,959,762. G. H. Mains, to Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.

For plywood mfr., adhesive papers impregnated with aldehyde-phenol condensation product. No. 1,960,176. J. Weber & F. Hengstebeck, to Th. Goldschmidt Corp., N. Y. City.

Laminating process using phenol & formaldehyde in aqueous caustic soda solution. No. 1,960,177. J. Weber & F. Hengstebeck, to Th. Goldschmidt Corp., N. Y. City.

Laminated glass, cellulose ester with glycol & dibutyl phthalate. No. 1,960,520. G. B. Watkins, to Libbey-Owens-Ford Glass Co., Toledo, Ohio.

Machinery

Apparatus for drawing flat, unwrinkled cellulose tubing. No. 1,958,181. S. F. Clement, to The Visking Corp., Chicago, Ill.

Traveling molds, with ejector, etc., for molding plastic material. No. 1,958,422. R. W. Dinzl, Phila., to Gen. Motors Corp., Detroit, Mich.

Traveling dies for plastic composition materials. No. 1,959,612. J. P. Burke, to Auto-Mold, Inc., Knoxville, Tenn.

Apparatus for producing phthalic anhydride by catalytic vapor phase oxidation. No. 1,959,898. Est. J. Brode & A. Johannsen, Mannheim, to I.G.F., Frankfort, Germany.

Sandwich method for sheet glass, with edge-sealing process. No. 1,960,580. Frank Fraser, to Libbey-Owens-Ford Glass Co., Toledo, Ohio.

Machine for crushing & mixing viscous and other substances. No. 1,960,708. Evarts G. Loomis, Newark, N. J.

Apparatus for treating moldings of partly cured phenolic condensation product. No. 1,960,717. F. S. Smith, Brooklyn, N. Y.

Method & apparatus for making safety glass. No. 1,959,221. J. H. Sherts, to Duplate Corp., Del.

Miscellaneous

Trade mark, No. 312,703. Hardened plastic composition for manufacturing purposes in the arts. A. Knoedler Co., Lancaster, Pa.

Multicore cable with thermoplastic insulation. No. 1,957,487. O. E. Buckley & F. S. Malm, to Bell Tel. Labs., Inc., N. Y. City.

Tanned leather, surfaced with uniform compo. of cellulose ester & China wood oil. No. 1,959,112. C. G. Shaw, Huntsville, & J. Hoffman, Toronto, Ontario, Can.

Adverse decision on claim 1 of No. 1,897,188 (dialkyl resorcinols) vs. W. G. Christiansen and S. E. Harris.

Trade mark renewed, No. 97,126. Insulating material. The Cutler-Hammer Mfg. Co., Milwaukee, Wisc.

For marble-like or cloudy & opaque effects in phenol-formaldehyde condensation products. No. 1,960,116. Karl Loos, Astoria, N. Y. City.

Mfr. of articles from synthetic resinous compounds, hardening by electric current and freeing from water by the heat generated in the resistance body. No. 1,960,120. E. Mohring, to Saureschutz Gess., Berlin, Germany.

Composite material, asbestos sheets, phenol resin & powder and cement. No. 1,960,180. R. H. Cunningham, to Bryant Elec. Co., Bridgeport, Conn.

Trade marks, "Puritan" and "Gold Shield" for grades of ethyl alcohol. Nos. 348,839-40. Rossville Comm'l Alc. Corp., N. Y. City.

Method & apparatus for detecting holes in sheet, using pressure gas & electric control circuit. No. 1,960,281. E. Schweitzer, to Celluloid Corp., Newark, N. J.

Manufacture of furfural. No. 1,960,812. B. S. Groth & G. H. Blomqvist, Stockholm, Sw.

In the mfr. of sheets or films of compositions of cellulose esters or ethers. No. 1,961,025. A. R. Wickham, to Spicers Limited, London, England.

Design for button. No. 92,337. L. R. Carley, to The Patent Button Co., Waterbury, Conn.

Trade mark, "GILBERT," bowls & tumblers of condensation products. No. 347,405. A. C. Gilbert Co., New Haven, Conn.

Phenol

In the catalytic production of diphenyl substances from hydrocarbons of the benzene series. No. 1,957,988. E. Tschunker & W. Klein, to I.G.F., Frankfort, Germany.

Phenyl-phenol from halogenated diphenyl. No. 1,959,283. E. C. Britton, to Dow Chem. Co., Midland, Mich.

Pyroxylin

Method of seasoning sheets of pyroxylin with carbon tetrachloride, to free both this and alcohol. No. 1,958,136. G. J. Esselen, to Fiberloid Corp., Indian Orchard, Mass.

Process for seasoning sheet pyroxylin plastic. No. 1,958,140. G. C. Gress, to Fiberloid Corp., Indian Orchard, Mass.

Using softener for activating dry pyroxylin cement. No. 1,959,321. W. H. Wedger, to Boston Blacking & Chem. Co., Boston.

Resins

Trade mark, "BRESIN," for resin. No. 349,322. Hercules Powder Co., Wilmington, Del.

Substitute from disintegrated wood, uniformly filled with pulverized synthetic resin, reacted, then compressed. No. 1,959,375. E. C. Loetscher, Dubuque, Ia.

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